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The AUTOMOBILE

German Automobile Profits Over $7,000,000 Yearly

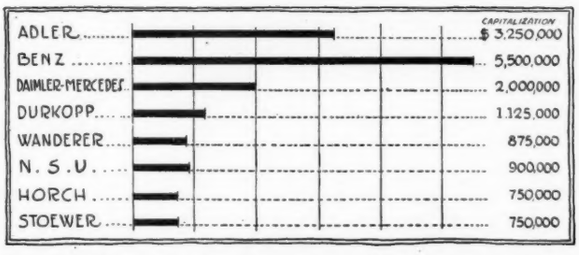
Fifty Leading Automobile, Truck and Accessory Firms Average $1,122,193 Profit Apiece in Past 8 Years

THE fifty leading German concerns which are making automobiles, motor car parts, forgings, accessories, or which are manufacturing some specialties for the automobile trade, have made a total profit of $56,109,687 during the last 8 years from 1906 to 1913 inclusive. This means an average profit of $1,122,193 per concern.

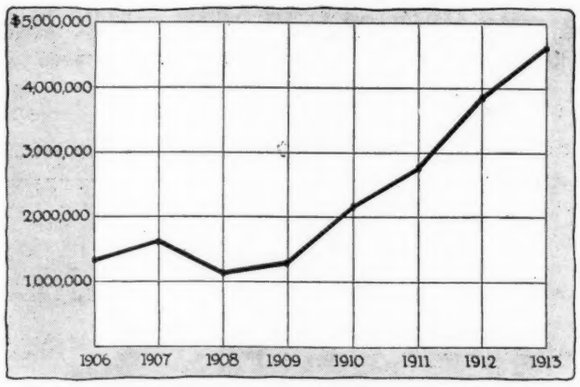
The total capital stock of these fifty concerns amounts to $45,912,500, or an average of $918,250 per concern. The profits of these half-hundred leaders in the German automobile industry have thus amounted to 122.2 per cent. of their capitalization and show $10,197,187 excess over the total capital stock.

During the same period of 8 years only fifteen from among the fifty leading concerns have lost money either during only one year or during several years. Their total loss amounts to $3,552,979, or 7.7 per cent. of the total capitalization of all concerns. The total capital of these fifteen losing companies being $10,806,250, their loss represents 30 per cent. of their capital.

Of the fifty automobile concerns about which reference is made in this article, eighteen are making automobiles either exclusively or as an added industry, nine are making automobile tires and other rubber goods, and the remaining twenty-three concerns are engaged in the manufacture of parts, accessories, supplies, specialties, bicycles, motor cycles, etc., but all are directly interested in the automobile industry.



Capitalization of eight leading automobile manufacturers of Germany



Profit of the eight leading German automobile manufacturing concerns during the past 8 years. Note drop in 1908, and subsequent steady progress up to the present time.

Over the Century Mark

There are more than 100 concerns in Germany which are connected with the automobile industry, but this article deals only with those companies concerning which information and data have been forthcoming relative to their profit or loss.

Complete data are presented herewith as to the profit or loss of the eight leading automobile manufacturers, excepting the Opel, which, not being a stock company, does not publish yearly statements as to its business.

These eight leaders are Adler, Benz, Daimler-Mercedes, Durkopp, Wanderer, N. S. U., Horch and Stoewer. Their total capital stock amounts to $15,150,000, or 30 per cent. of the total capital of the fifty leading German concerns, and their total profits amounted to $18,807,137, or approximately 30 per cent. of the total profits of the fifty concerns already mentioned.

Benz Leads Profits

Of these eight concerns, and in fact of the whole German industry, the Benz company is the most important, its capital stock of $5,500,000 being nearly one-third of the total capital

Map of Germany, showing the location of the principal automobile and accessory manufacturing concerns

Financial Standing of Fifteen Leading German Automobile Makers

Total capital stock of 50 leading concerns	$45,912,500
Average capital stock per concern	918,250
Total profit since 1906 of 50 leading concerns	56,109,687
Average profit since 1906 per concern	1,122,193
Average yearly dividend paid by each concern during 8 years	10½%
Total loss sustained by 15 concerns in 8 years	$3,352,979
Average loss per concern	223,532

Financial Standing of Eight Leading German Automobile Makers

Total capital of the 8 leading German automobile manufacturers	$15,150,000
Average capital per concern	1,893,750
Total profits of the 8 leading concerns	18,807,136
Average profit per concern	2,350,890
Average yearly dividend	16%
Capital of largest exclusive automobile manufacturer—Benz	5,500,000
Largest total profit of any exclusive automobile manufacturer—Benz	4,127,719
Average profit per year	515,964
Largest profit for one year of any German automobile manufacturer—Benz, 1913	1,572,036
Largest dividend paid by any German automobile manufacturer in 8 years—Adler	30%
Biggest loss during a single year sustained by any German automobile manufacturer — Eisenach-Dixi, 1906	286,231

stock of the eight leaders. The Benz company is also the one which earned the largest profit in 1 year from among all German automobile builders, and this 1 year's profit, $1,572,036, represents 3 1-2 per cent. of the total profits of the fifty concerns and 12 per cent. of the total profit made by the eight leading concerns.

Nine Leading Tire Makers

The tire industry occupies a very important place in the German automobile industry, and the nine leading tire manufacturing concerns having a total capital of $10,675,000 have earned in 8 years a total profit of $16,332,288, or 153 per cent.

Among the tire manufacturers, Continental has been the biggest profit maker. In fact, the Hanover company has become during the last decade one of the largest dividend-paying concerns in Germany, regardless of industry. Last year, 1913, the Continental for the first time in its history passed the $2,000,000 profit mark, having earned exactly $2,188,396, or 171 per cent., as its capital stock is $3,750,000. The total profits of this concern in 8 years amount to $9,904,285, or more than one-half of the total profits made by the nine tire manufacturers during these 8 years.

Tire Makers Also Heavy Losers

While the nine tire manufacturers have cleared among them during the last 8 years nearly one-third of the total profits made by the fifty leading concerns in the German automobile industry, they have also been the heaviest losers. Five from among the nine concerns lost a total of $2,011,719, while the total loss among ten automobile, motor-car parts and accessories manufacturers has only amounted to $1,541,260 during the same period.

Shrewd Business Methods

One of the principal causes of the profitable business of the majority of German automobile manufacturing concerns is their conservative business methods.

Unlike the American, and to some extent the Englishman, who believed and had faith in the great future of the auto-

Tabulation Showing the Profit and Loss of the Eight Leading Manufacturers of Automobiles in Germany

Concern	Location	Started	Capital	1906	1907	1908	1909	1910	1911	1912	1913	Total	Yearly Average	Total and Average Yearly Dividend	
Adler	Frankfurt-a-M.	1895	$3,250,000	25% $460,834	25% $473,505	25% $467,512	25% $575,852	30% $710,290	30% $880,517	30% $1,019,555	25% $1,047,831	$5,635,896	$704,487	215	27
Benz	Mannheim	1899	5,500,000	7% 161,087	15% 284,419	8% 173,040	 14,081	8% 308,504	8% 503,194	10% 1,111,351	12% 1,572,036	4,127,712	515,964	68	8.5
Daimler-Mercedes	Stuttgart	1890	2,000,000	6% 177,555	6% 226,460	6% 80,473	8% 202,039	10% 402,792	10% 573,259	12% 715,610	14% 803,542	3,181,730	397,716	72	9
Durkopp	Bielefeld	1889	1,125,000	25% 232,834	25% 232,531	17% 138,104	23% 219,221	28% 284,476	28% 280,762	28% 259,120	22% 259,623	1,906,671	238,334	196	24.5
Wanderer	Schonlau-Chemnitz	1885	875,000	18% 98,103	20% 167,428	20% 114,944	20% 139,490	25% 209,368	27% 265,502	27% 349,468	24% 346,450	1,690,753	211,344	181	22.5
N. S. U.	Neckarsulm	1884	900,000	12% 83,398	12% 115,130	8% 75,918	 47,837	8% 44,043	8% 47,965	10% 158,415	12% 254,293	826,999	103,374	61	7.5
Horch	Zwickau-i-Sa	1904	750,000	25% 56,171	25% 81,168	19% 50,635	12% 49,450	12% 76,288	12% 97,475	15% 133,575	15% 177,148	721,910	90,238	135	17
Stoewer	Stettin	1858–1896	750,000	10% 75,386	12% 83,453	9% 56,141	10% 74,580	13% 108,564	13% 113,643	13% 113,736	10% 89,962	715,465	89,433	90	11
Totals			$15,150,000	$1,345,368	$1,664,094	$1,156,767	$1,322,550	$2,144,325	$2,762,317	$3,860,830	$4,550,885	$18,807,136	$2,350,890	1018	127
Average per concern			$1,893,750	$168,171	$208,011	$144,596	$165,319	$268,040	$345,289	$482,602	$568,860	$2,350,890	$293,861	127	16

mobile industry when the motor car was still looked upon as a toy, when the first Daimlers and Benz and Panhards and De Dion Boutons were in their infancy, the German, generally speaking, has been rather slow to come to the same conclusion as the Anglo-Saxon.

Yet within a few years the German automobile business has become one of the most important in the world, and the Continental countries look at the Germans as their ultimate strongest competitors.

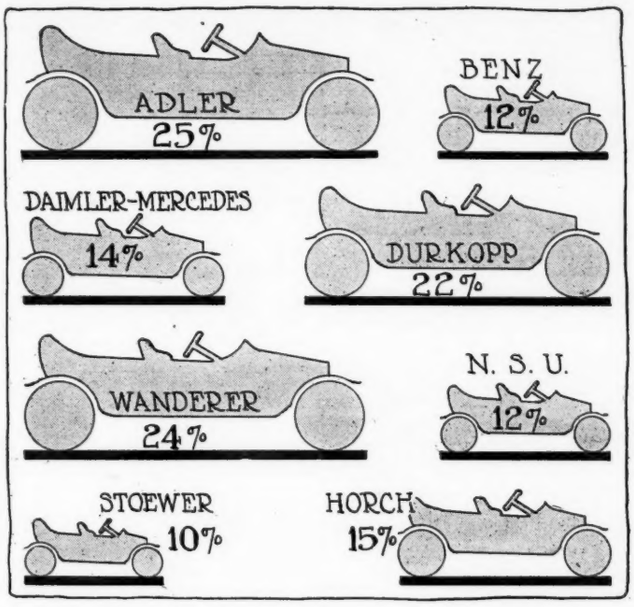
But even with a bright future before them, with the knowledge that their cars are liked and are selling, the policy of the German car manufacturers remains one of conservativeness. Rather a small profit than a big loss, do they say, "Let the other man make a thousand cars; I will only make 500 and know that these 500 are sold."

Benz Has Rapid Growth

One of the officials of the Benz company spoke interestingly about his own concern on this subject while in Brussels recently: "Our business has increased so rapidly during the last 3 years that it has been found necessary to greatly increase our capital stock. We have adopted some of the ideas and policies which have made so many American concerns important in a short time, almost over night. Although our policy will always be to go forward we will not take chances and go too fast. We would have no difficulty in raising twice the amount of our present capitalization and doubling the capacity of our plants, but we believe it is not only better but safer to be conservative and satisfied with a moderate and progressive growth rather than to overcapitalize and run the chances of losing in 1 or 2 years all the profits made in previous years.

"It is this idea, this way of doing business, which has always been the fundamental cause of the small percentage of failures among the German automobile manufacturers. Although the name of Benz is pretty well known all over the world we have come to the conclusion that it requires advertising strongly to increase our business, and we started some time ago advertising in Germany such as no other German automobile manufacturer ever attempted. Our growth has been gradual. We never invested too much capital. We have been satisfied during the early stages of our history to grow slowly and to put aside for emergency purposes a large part of our annual profits."

The general manager of another concern building only 250 to 300 cars annually said: "Since 1910 we have constructed about the same number of cars every year and do not intend



The 1913 dividends of the eight leading German automobile manufacturers range from 25 per cent. to 10 per cent.

Financial Standing of the Nine Leading Tire Makers

Total capital stock of the 9 leading tire manufacturers	$10,675,000
Average capital stock per manufacturer	1,186,111
Total profits	16,332,288
Average profits	1,814,698
Average dividend	12%
Largest dividend—Continental	45%
Largest profit of one concern in 8 years—Continental	9,904,285
Largest profit for a single year—Continental, 1913	2,188,396
Biggest loss sustained during one year by one concern—Peters Union	488,054

Ten Car and Parts Makers Losing Money in Past 8 Years

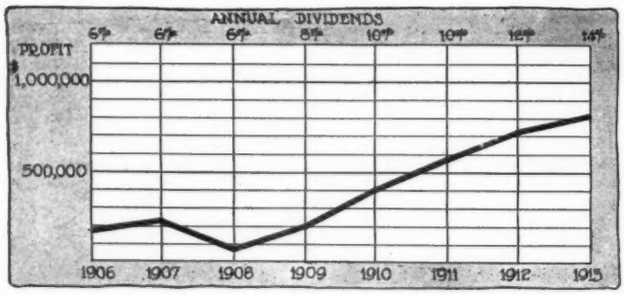
Total capital stock of 10 automobile and parts manufacturers having lost money during last 8 years	$8,256,250
Total loss of these 10 concerns in 8 years	1,541,260
Average loss per concern	154,126
Total loss in proportion to total capital	23.6%
Total capital stock of 5 tire concerns having lost money during last 8 years	4,550,000
Total loss of these 5 concerns	2,011,719
Average loss per concern	402,344
Total loss in proportion to total capital	44%

Standing of Twenty-three Parts and Accessory Concerns

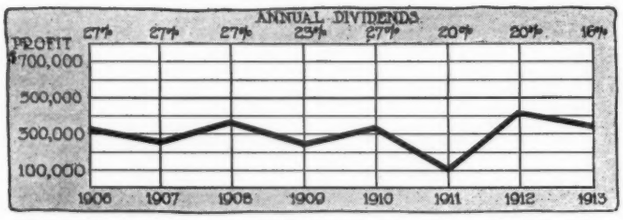
Total capital stock of 23 parts and accessories makers	$13,325,000
Total profit of these 23 concerns in 8 years	17,924,974
Average capital per concern	579,343
Average profit per concern	779,346
Average yearly dividend	11%

Tabulation Showing the Profits and Loss of Leading Automobile Manufacturing Concerns in Germany

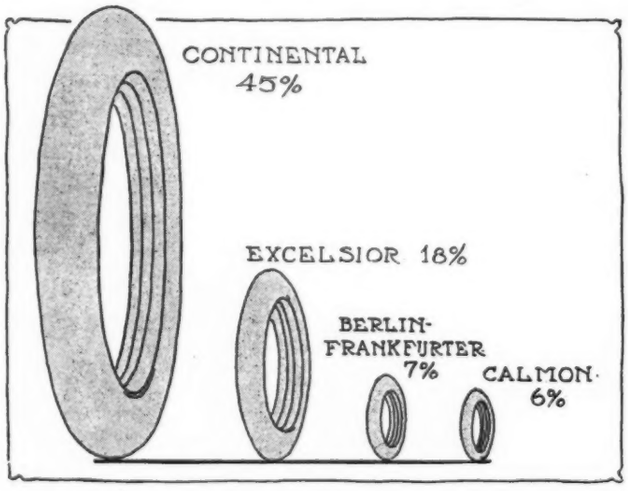
Concern	Location	Started	Capital	1906	1907	1908	1909	1910	1911	1912	1913	Total	Yearly Average	Total and Average Yearly Dividend	
Eisenach-Dixi	Eisenach	1896	$750,000	*	....	....	4% $37,062	7.5% $77,682	5% $49,821	5% $70,609	6% $78,469	$460,229	$65,747	27.5	4
Westfalia	Oelde-i-W	1889	350,000	$286,231 8% 30,956	$91,214 9% 38,734	$55,372 7% 26,523	7% 24,695	5% 17,625	6% 32,785	.... * 16,915	* 75,400	188,233	26,890	42	6
Presto	Chemnitz	1906	375,000	....	7% 33,308	7% 37,944	7% 29,498	7% 26,222	* 36,582	* 46,152	 41,884	168,856	33,771	28	5.5
Fafnir	Aachen	1891	500,000	6% 16,797	6% 16,678	* 2,385	* 6,007	4% 13,389	7% 27,277	7% 29,783	* 13,852	103,924	20,785	30	6
Dux-Polyphon	Wahren-Leipzig	1895	312,500	* 8,792	 10,257	 154,718	* 218,767	 34,448	 77,002	5% 32,345	5% 34,787	188,839	37,767	10	2
Loreley-Ley	Anstadt-in-Th	1909	350,000	....	....	....	....	7% 22,344	8% 41,306	9% 47,335	5% 31,675	142,660	35,665	29	7
N. A. G	Berlin	1901–1912	1,750,000	....	....	....	* 114,731	 37,997	 106,798	 166,091	 147,736	458,622	114,655	....	....
Hansa	Varel-Lei. Old	1905–1913	1,125,000	....	....	....	....	....	4% 38,149	6% 79,656	....	117,805	58,902	10	2
Lloyd	Bremen	1906	750,000	 3,939	* 14,143	* 71,420	* 33,214	* 85,091	* 21,881	* 771	....	3,939	3,939	....	....
Mulag	Aachen	1909	500,000	....	....	....	....	....	5% 16,897	10% 74,535	10% 120,750	212,182	70,711	25	8
Totals			$6,762,500	$51,692	$190,191	$119,839	$91,255	$230,707	$390,035	$517,269	$445,301	$2,045,289	$468,832	201.5	40.5
Average per concern			$676,250									$204,528	$58,604	20	4



Dividends paid by Daimler-Mercedes from 1906 to present time. The increase has been practically constant since 1908



Dividend fluctuations during past 8 years of Kron-Prinz Co. The average profit has been about $300,000



The 1913 dividends of the four leading German tire concerns. The Continental company is by far the largest

to increase this output for several years. We feel that the automobile industry does not warrant taking great chances because the public's taste is very changeable. A concern may sell all its cars 1 year and think that means the next year it will have as great a success and therefore increase its output. But sometimes the next year some other concern's cars are the kind the public wants, and then the firm which has built more cars because it thought it would meet with as much success as the previous year has a lot of cars on hand and must dispose of them, generally at a loss.

1913 the Leading Year

The year 1913 was the banner year in the history of the Benz company, more than 1½ million dollars, exactly $1,572,036, being cleared, which is a rather remarkable result, considering that 5 years ago, in 1909, the concern's profits were so small that no dividend could be paid the stockholders. Since then the capital stock has been increased several times, which has enabled Benz to expand to its present importance.

The concern, which started in business in 1899, has made $4,127,712 profit in 8 years, or an average of $515,964 annually, while its average dividend has been 8½ per cent., with 15 per cent. as its high mark in 1907. A year ago about 8,000 men were employed in the large plants in Mannheim and in Gaggenau, where the commercial and industrial vehicles are made, and according to recent statements there are now 9,000 men on the concern's pay roll.

The models turned out by this concern are varied, several sizes of passenger cars and trucks being manufactured.

Mercedes Gains in 8 Years

Many changes have been made during the last 3 years in the management of the Daimler-Mercedes works of Unterturkheim-Stuttgart and Marienfelde. The capital stock has been increased and the business methods greatly changed. One of the big changes was the decision to keep out of all kinds of automobile contests, especially the road races. There were many in the German trade who thought this to be a mistake, but the business results have proven the contrary. The total profits of the Daimler concern during the last 8 years amounts to $3,181,730, or a yearly average of $397,716. The average dividend has been 9 per cent. and 14 per cent. the highest paid. At the present time it is reported that there are about 3,750 men employed in the several plants. This company re-entered racing last fall.

Adler is a name which is not well known in the United States but which ranks with those of Benz, Mercedes and

Profit and Loss of German Tire Manufacturers During the Past 8 Years

Concern	Location	Started	Capital	1906	1907	1908	1909	1910	1911	1912	1913	Total	Yearly Average	Total and Average Yearly Dividend	
Continental	Hanover	1871	$3,750,000	40% $739,113	40% $789,492	40% $792,609	40% $1,118,165	45% $1,440,974	45% $1,271,274	45% $1,564,262	45% $2,188,396	$9,904,285	$1,238,036	340	42.5
Excelsior	Hanover	1862	750,000	21% 127,941	21% 150,848	21% 140,057	25% 179,946	25% 173,123	25% 219,593	25% 205,971	18% 165,350	1,362,829	170,353	181	22.5
Berlin-Frankfurter	Berlin	1869	875,000	9% 90,491	9% 94,599	9% 110,096	9% 112,928	9% 113,003	9% 114,036	9% 117,028	7% 94,953	847,134	105,891	70	8¾
Louis Peters	Frankfurt-a-M	1905	1,250,000	8% 89,214	16% 267,594	22% 385,055	25% 404,122	25% 489,230	* 282,843	* 488,054	594	1,635,809	272,635	96	16
Calmon	Hamburg	1896	1,000,000	6% 105,394	6% 106,244	6% 111,158	6% 79,371	* 391,661	6% 22,326	6% 103,257	6% 103,025	630,775	90,110	42	6
Harburg-Wien	Harburg-a-E	1872	1,500,000	.....	67,718	110,032	6% 135,305	7% 154,443	* 91,955	7% 282,855	6% 204,749	955,102	159,183	26	4½
Metzeler	Munchen	1901	700,000	5% 79,175	5% 85,741	5% 75,509	6% 139,671	7% 138,885	* 183,607	6% 28,580	* 212,813	547,561	91,260	28	4.5
German Dunlop	Hanau	1907	750,000	.....	4% 26,381	4% 55,754	4% 74,809	* 230,340	* 140,456	 78,781	 175,381	411,106	82,221	12	2.5
Ger. Michelin	Frankfurt-a-M	1906	100,000	.....	5,513	4,400	5,502	6,635	7,377	8,260	.....	37,687	6,281	....	....
Totals	.....	.....	$10,675,000	$1,231,328	$1,594,130	$1,784,670	$2,249,819	$2,607,748	$1,634,606	$2,380,734	$2,932,448	$16,332,288	$2,215,969	795	107
Average per concern	.....	.....	$1,186,111	.....	.....	.....	.....	.....	.....	.....	.....	$1,814,698	$246,218	88¼	12

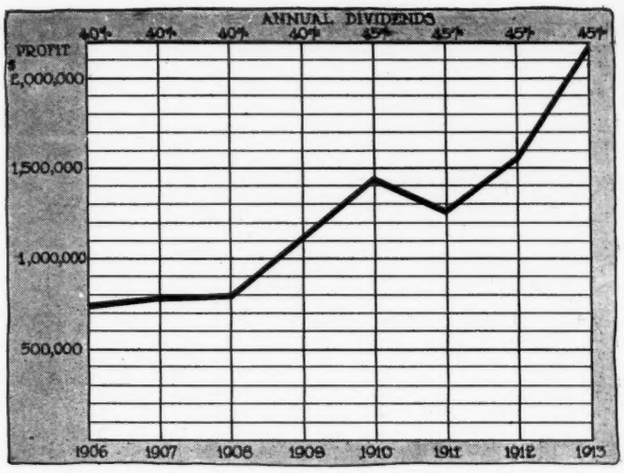
*—Loss.

Opel in Germany. The Adler business was started some 30 years ago by Heinrich Kleyer, and the concern was known for a long time as the Kleyer works.

From a small machine shop in which six men were employed there has arisen one of the largest manufacturing concerns in Germany, not only in the automobile business but in several industries, as the Adler concern, in addition to making automobiles, also makes bicycles, motor cycles, typewriters and motors for flying machines.

Of all German automobile concerns, it is the one which has been doing the largest foreign business in cars of a medium price, and it was one of the first to allow long credit to foreign agents.

Since 1906 Adler has made $5,635,896 profits, or an average of $704,487 annually, 1913 having been the biggest year, when $1,047,817 were made. This represents about $30,000 increase over 1912, when a 30 per cent. dividend was paid. The dividend last year was reduced to 25 per cent. At present 7,000 to 8,000 men are employed in the plant, which is being enlarged and will employ 10,000 by January, 1915.



Graph showing advancing dividends of Continental Tire Co.

Dividends of 28 Per Cent.

The Durkopp company is one of the oldest making automobiles, having made a specialty in building commercial and industrial vehicles. It has always been a successful enterprise and has been paying an average of 24½ per cent. dividend yearly during the last 8 years. In 1910 the concern made its largest profit, $284,476 and paid a dividend of 28 per cent.

The Wanderer works, which were established in 1885, became first known owing to their bicycles, and later on account of their motor cycles, but like most of the successful bicycle manufacturers, Wanderer motor cars were started more than 10 years ago, and at present the automobile department of the business is probably its most important part. In 1911 and in 1912 Wanderer stockholders received a 27 per cent. dividend, while the average dividend for the last 8 years has been 22½ per cent. It was in 1912 that the concern earned its largest profit for 1 year, $349,468.

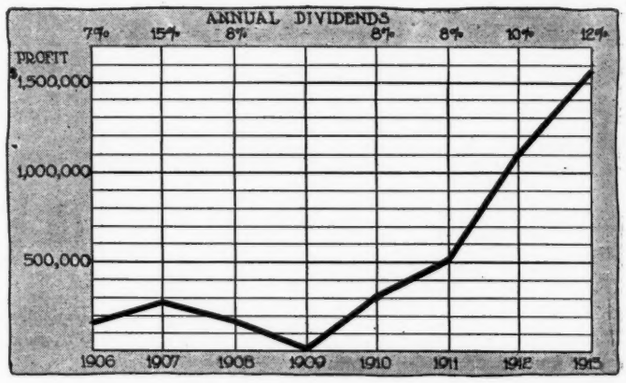


Chart showing dividend of Benz company for past 8 years

N. S. U. Started in 1873

The Neckarsulmer Fahrradwerke, which make the N. S U. cars, is another instance of a successful concern in the bicycle and motorcycle field. Established in 1873, this concern has been making automobiles during the last 10 years, especially light cars. An average dividend of 7½ per cent. has been paid since 1906. Last year was the best in the financial history of the company, when $254,293 profits were made and a 12 per cent. dividend allowed.

Smaller Companies Are Successful

The Horch concern of Zwickau is one of the younger firms in the automobile business, having been established in 1904. Its growth has, however, been very rapid, as from a little

Profit and Loss for Eight Years of Companies Manufacturing Automobile Parts and Accessories in Germany

Concern	Location	Started	Capital	1906	1907	1908	1909	1910	1911	1912	1913	Total	Yearly Average	Total and Average Yearly Dividend	
Kronprinz Metallindustrie	Ohligs-Rhein	1897	$1,400,000	27% $320,870	27% $261,056	27% $363,884	23% $257,575	27% $324,266	20% $102,864	20% $415,512	16% $336,166	$2,362,193	$295,274	187	23½
Gritzner	Durlach	1886	1,125,000	14% 209,155	15% 240,402	13% 206,927	14% 234,886	16% 286,399	17% 318,293	18% 355,157	18% 339,831	2,191,050	273,881	126	16
Lud. Loewe	Berlin	1869	1,875,000	12% 343,549	16% 337,436	16% 335,606	16% 343,251	16% 269,248	18% 400,333	18% 404,096	18% 429,750	2,863,269	357,908	130	16
Seidel & Naumann	Dresden	1886	750,000	18% 328,464	16% 285,200	16% 290,477	12% 289,984	15% 345,142	10% 215,527	8% 142,700	8% 135,082	2,032,576	254,072	103	12¼
Leipziger Werkzeugmachinen Fabrik	Leipzig	1895	525,000	20% 107,921	20% 120,935	20% 103,513	20% 106,423	20% 108,502	20% 145,383	25% 244,993	25% 273,840	1,211,510	151,439	170	21
H. Wissner	Mehlis-i-Th	1898	250,000	20% 68,845	20% 68,401	17% 54,300	15% 48,476	20% 71,834	21% 78,823	21% 78,152	23% 87,950	556,787	69,598	157	19.5
Triumph Werke	Nurnberg	1896	250,000	10% 65,129	12% 68,384	10% 54,161	8% 46,369	8% 38,893	8% 32,678	4% 19,886	 7,499	332,999	41,625	60	7.5
Victoria Werke	Nurnberg	1895	400,000	8% 42,123	8% 42,331	6% 28,240	5% 27,988	4% 23,936	6% 35,770	7% 39,667	6% 36,264	276,269	34,534	50	6
Westfalische Metal Industrie	Lippstadt	1899	250,000	10% 17,943	10% 20,063	7% 14,572	4% 7,280	11% 31,776	12% 32,974	12% 34,256	12% 37,356	196,220	24,527	78	9¼
Total			$6,825,000									$12,022,867	$1,502,858	1061	131
Average per concern			$758,333									$1,335,874	$166,984	118	14.5

Tabulation Showing the Profit and Loss of Some Automobile Concerns in Germany in Past 8 Years

Concern	Location	Started	Capital	1906	1907	1908	1909	1910	1911	1912	1913	Total	Yearly Average	Total and Average Yearly Dividend	
Durener Metal Werke	Duren	1900	$750,000	.....	10% $135,637	12% $147,218	12% $157,424	12% $163,866	12% $186,212	12% $171,637	12% $219,867	$1,181,861	$168,837	82	12
Krefelder Stahl Werke	Crefeld	1900	1,125,000	20% $176,975	20% 123,039	* 248,478	 13,632	5% 158,114	10% 151,108	12% 188,049	12% 190,927	1,001,844	143,120	79	11
Excelsior Werke	Brandenburg	1906	412,500	.....	20% 109,986	20% 66,125	20% 68,325	20% 93,289	25% 119,267	25% 124,732	25% 102,010	683,734	97,676	155	22
Pfalzische Nahmaschinen Fabrik	Kaiserslantern	1891	562,500	9% 82,480	7% 59,302	9% 74,208	9% 73,692	12% 110,690	12% 119,552	12% 148,529	.....	668,543	95,506	70	10
Stahlwerk R. Lindenberg	Remschied	1864	750,000	.....	9% 42,933	10% 69,088	7% 69,845	8% 71,262	9% 89,442	12% 116,468	12% 116,182	575,220	82,174	67	9.5
Hercules Werke	Nurnberg	1898	250,000	12% 59,392	12% 66,324	10% 46,435	8% 36,723	8% 38,786	8% 46,11*	8% 44,641	.....	338,412	48,344	66	9½
Metallindustrie Schonebeck	Schonebeck-a-E	1897	312,500	42,576	13,738	17,586	.....	.....	5,791	5% 16,865	7% 28,078	124,634	20,772	12	2
H. W. Schladitz	Dresden	1877	193,750	11% 58,912	11% 54,541	8% 35,404	.....	10% 25,398	7% 12,410	9% 20,021	.....	206,686	34,447	56	9½
Corona Werke	Brandenburg-a-H.	1892	212,500	13% 36,670	14% 40,390	14% 52,096	9% 28,093	6% 17,173	8% 31,512	8% 30,569	.....	236,503	33,786	72	10
Anker Werke	Bielefeld	1876	468,750	10% 55,354	10% 70,027	5% 32,641	* 57,000	5% 37,615	5% 40,664	6% 47,955	7% 54,100	338,356	48,336	48	7
Mars Werke	Nurnberg-Doos	1898	125,000	6% 32,494	9% 47,894	9% 55,462	* 26,277	4% 7,455	5% 8,885	5% 9,074	* 9,868	161,264	26,877	38	6
Dorflingersche Achsel & Federn	Mannheim	1872	225,000	.....	10% 23,887	6% 12,293	4% 8,881	4% 9,021	5% 11,095	8% 28,963	.....	94,140	15,690	37	6
Martini & Huneke	Berlin	1907	300,000	.....	.....	10% 33,153	 2,043	 6,214	7.5% 33,622	7.5% 37,579	.....	112,611	22,522	25	5
Oberursel	Oberursel	1898	562,500	6% 25,177	5% 23,200	5% 24,473	3% 12,868	4% 17,499	7.5% 44,673	8.5% 56,582	8.5% 73,827	278,299	34,787	47.5	6
Total			$6,500,000	.....	.....	.....	.....	.....	.....	.....	.....	$6,002,107	$372,868	854	125
Average per concern			$464,285	.....	.....	.....	.....	.....	.....	.....	.....	$428,500	$62,347	61	9

*=Loss.

plant occupying only a score of men there has been built up in less than 10 years a big concern which now has 800 men. Last year was the big year in the Horch history, when $177,148 profit was made and the stockholders received a dividend of 15 per cent.

Since 1896 automobiles are being made by the Stoewer Bros. concern, which has made a specialty of commercial and industrial motor cars. Only 200 to 300 men were employed 10 years ago and today there is a force of 1,500 men. Since 1906 an average dividend of 11 per cent. has been paid.

One Concern Has Lost

The concern making the Dixi, or Eisenach, cars is known as Fahrzeugfabrik Eisenach works. It is one of the oldest in the business, but also one which has had a great deal of financial trouble which culminated in 1906 when there was a loss of $286,231, which is the heaviest loss sustained by a German automobile manufacturing concern since 1906. Although there has not been any loss since then the business results have not been satisfactory to a majority of the stockholders. Only recently there was a report current on the board of trade that there would be another reorganization. The military authorities greatly favor this concern.

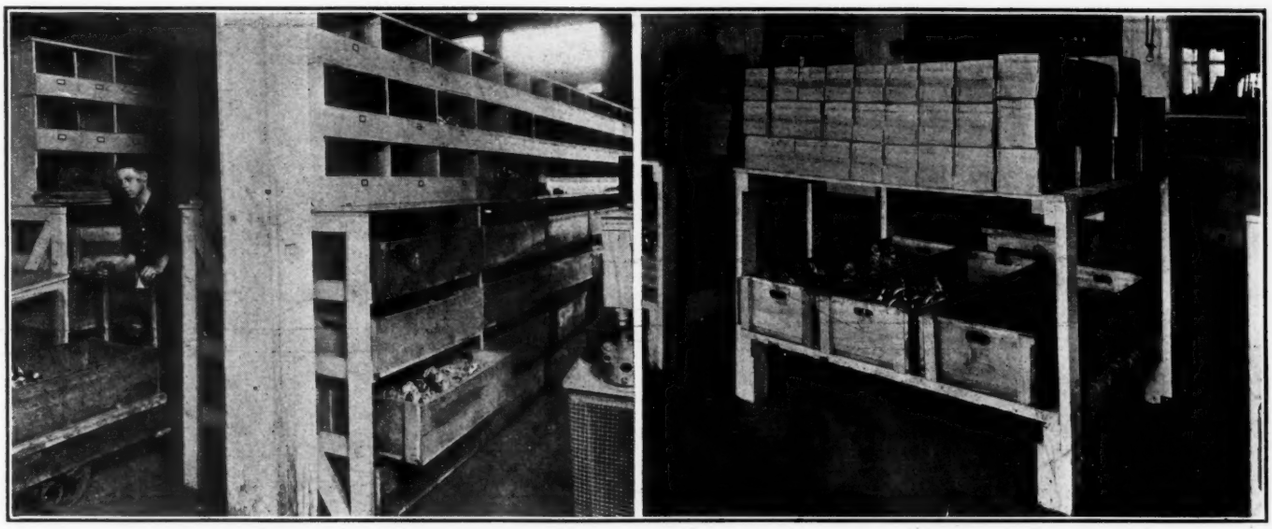
In the case of the Polyphon works there is a striking example of success in the automobile business after failure in another industry. This concern had been making music boxes and other musical instruments, losing heavily during many years. Since 1910 automobiles were made and since then there has been prosperity. A total profit of $178,000 has been made in 4 years, while during the previous 4 years there had been a total loss of $381,677. The concern which make the Dux cars now employs more than 1,000 men.

The N. A. G. cars are made by the Neue Automobile Gesellschaft since 1901. In 1912 there was a reorganization of the concern, which is now owned by the Bergmann Elektricitats Werke. The company has always made a specialty of building commercial and industrial vehicles, also electrics, but in recent years it has made light cars at a low price. There are now more than 1,500 men employed in the various factories and the concern is probably the largest producer of commercial cars in Germany.

Tabulation Showing the Profit and Loss in the Past 8 Years of Concerns Engaged in the Automobile Business

Concern	Location	Started	Capital	1906	1907	1908	1909	1910	1911	1912	1913	Total	Yearly Average	Total and Average Yearly Dividend	
D. W. F.	Berlin	1889	$3,000,000	20% $881,692	20% $811,770	20% $845,239	22% $889,673	24% $968,511	25% $1,211,307	32% $1,442,715	32% $1,446,139	$8,497,046	$1,062,130	195	24½
Bergmann	Berlin	1893	11,937,500	18% 576,133	18% 689,955	18% 792,002	18% 976,379	12% 812,971	5% 479,695	5% 595,005	5% 794,654	5,716,794	714,599	99	12½
Deutz	Coln	1872	5,500,000	6% 359,657	6% 419,782	6% 424,866	5% 358,655	7.5% 536,527	8.5% 660,821	9% 811,378	9% 869,312	4,440,998	555,124	57	7
Siemens Halske	Berlin	1897	15,750,000	....	....	12% 2,422,065	12% 2,848,199	12% 2,616,803	12% 2,817,048	12% 2,831,038	12% 2,811,002	16,346,195	2,724,366	72	12
A. E. G.	Berlin	1883	38,750,000	....	....	13% 3,982,802	13% 4,013,340	14% 4,514,477	14% 5,428,875	14% 5,936,109	14% 7,041,967	30,918,570	5,153,095	82	13.5
Total			$74,937,500	.....	.....	.....	.....	.....	.....	.....	.....	$65,879,603	$10,209,314	505	69
Average per concern			$14,987,500	.....	.....	.....	.....	.....	.....	.....	.....	$13,175,920	$2,041,863	101	13½

*=Loss.



Bins in the stockroom are the crates which go to the machines in machine shop at Wheeler & Schebler plant

System Cuts Schebler Cost 50 Per Cent.

Special Planning of Assembly Room and Efficient Routing of Work—Carbureters Are Assembled in Lots of Fifty

THE efficiency of the Wheeler & Schebler plant at Indianapolis, Ind., culminates in the layout of the assembly room. Through the arrangement of the men and the routing of the work it has been estimated that the cost of assembly has been cut down 50 per cent. since the introduction of the present system.

The assembly space is a rectangular room 150 by 120 feet, in the center of which there is a 20 by 30-foot skylight which permits light to pass into the floor below the assembly room, the latter being on the uppermost story of the building and directly under the roof. The stockroom occupies almost the entire west end of the assembly floor extending as far as the edge of the skylight opening, as illustrated. The only part that the stockroom does not take up of this end of the building is a small passageway on the south side devoted to an elevator for sending the finished carbureters down to the shipping room, and for an inspection space.

Individual assembly bench—a good example of motion study

Walking along the north wall from the stockroom there is first the salvage department devoted to odd repair jobs and then the true assembly space. At the eastern extremity of the room the actual assembly work is carried on.

The stock leaves the stockroom in trays which carry lots of fifty parts. That is, in the tray there are sufficient parts to make fifty carbureters. These parts are carried from the door of the stockroom, down the center aisle to the eastern extremity of the room, and starting at the northeast corner the parts go through a process of progressive assembly until they reach completion at the southeast corner of the room. In the actual assembly work the carbureters have traveled along the east wall of the room.

The assembly stands in this part of the room are in three rows. The row nearest the wall handles the model R, the second the model L, and the third the model H carbureter. These are the three models which are passing through the plant in quantities, and they are provided for by having the men in each of the rows trained to assemble the particular model which passes through their hands. The routing of the work through the assembly room thus becomes a simple proposition.

After passing through any one of the three rows the tray of fifty finished carbureters is started back toward the elevator, which will carry them to the shipping room. Before they reach the elevator, however, they must pass the scrutiny

Two views in the assembly department at the Wheeler & Schebler factory. Rows of individual assembly benches, individual lights, etc.

of the inspectors, who are seated in a row along the aisle leading from the assembly space to the shipping room elevator. In all this work they are put through in lots of fifty. A tray of this number is deposited at the inspection department and when the inspectors are ready to go over them they are still kept together, reaching the shipping department as a group.

Other Models Handled Separately

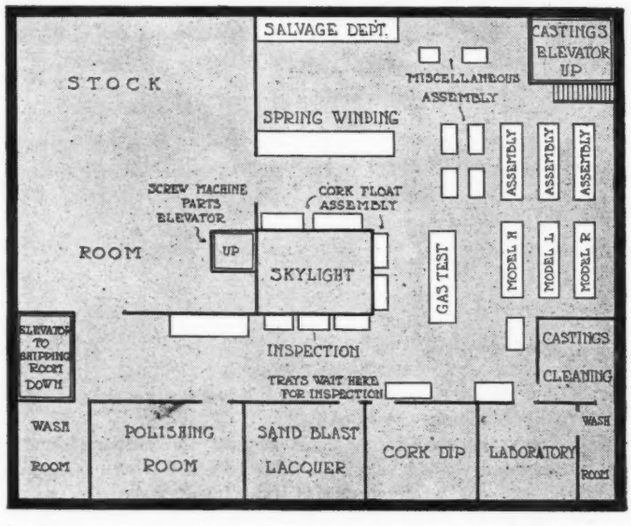
Should an order for any other model carbureter come in, this is regarded as a special order and is handled separately through what may be called the secondary assembly department, where all miscellaneous work is done. This department is operated through a series of benches which are placed behind the three rows taking care of the quantity work required by the models R, L and H. They are indicated on the map of the assembly floor by the word sub-assembly. After passing through the sub-assembly department the carbureters are taken to the inspection aisle in the same way as the other jobs. The exception in this though, is that while the three main models nearly always come through in groups of fifty, these special jobs may be for any indefinite number.

When carbureters which have been in use are sent back for repair they are brought to the salvage department and the entire work is done there. Tools and all the equipment necessary to take care of these old models are found in the salvage department and all the work incidental to repair can be carried on here.

All the space on the assembly floor does not have to be utilized for assembly, and consequently some of the smaller manufacturing jobs can be done on the same floor. In the Schebler plant the springs for the carbureters are wound along an aisle across from the skylight which is in the exact center of the floor. This department is indicated on the map.

Another department, which is a combination of manufacturing and sub-assembly work, is in connection with the floats. The cork dipping room, in which the three coats of shellac are applied to the cork ring floats, is located on the south side of the building and will be noted in the map. The floats are taken from this room and brought to the row of benches fronting on the east side of the skylight and then are carried along the east and north sides of the skylight in the process of assembling them with the levers and needle valves. After this assembly the carbureters are taken to the gasoline testing bench where they are given the proper float lever and then, passing to the polishing

Row of individual packing benches in the shipping room



Floor plan in assembly department of Wheeler & Schebler plant

and sand-blast departments, are ready for their final inspection. After the final inspection they are passed along the elevator on which they are carried to the shipping room.

In the shipping room itself examples of methodical arrangements are given. The carbureters are packed in individual boxes and, as will be seen from the illustrations, this work is taken care of in a systematic way. The carbureters pass from hand to hand, each individual performing the required operation, until they are finally boxed for shipment.

The department which contributes more to the cost-reducing system of the Schebler plant than any other save the assembly is that in which the castings are made. The capacity of the Schebler foundry is such that complete castings for between 18,000 and 19,000 carbureters could be put through in a day, or in the terms of the foundry men 8 tons of metal could be poured per day. There are about eight castings to the average carbureter, and at this rate in 1 day 144,000 castings could be made to take care of the needs of 18,000 carbureters. Where the efficiency comes in is in the use of but a small number of men to accomplish this result. For instance, if the order were given for 19,000 standard carbureter body castings, the cores for these castings could be drawn off in 1 day, by teams of four men working on piece work.

Individual assembly bench with trays conveniently placed, and supply bins from stockroom

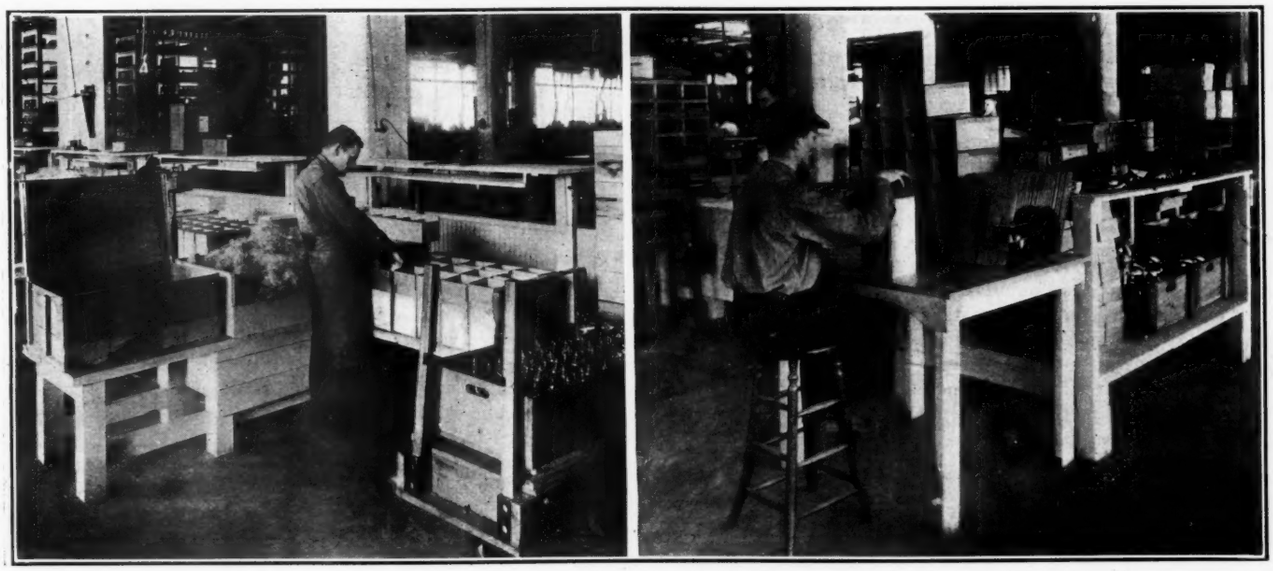
This team of four men consists of one man operating a hopper, a machine for pouring the sand into the core boxes, and three men for drawing off the core boxes from the sand. After this process the sand is baked by other men and is then ready for the metal. The man on the hopper has nine core boxes which he continuously keeps filled as fast as the other three men remove the cores from them. In this way nine core boxes are kept going continuously to each hopper. Little is lost in motion, time or material. The men, under the spur of the piece-work system, work at a steady and rapid, though smooth, rate. The bodies for the carbureters are cast in groups of four, for some of the models, and at this rate each man would be drawing off the core boxes sufficiently fast to be taking care of five carbureters every 2 minutes.

In saving time and material in the core room a gyrating griddle is used which can sift as much sand as three men would do through a hand-sifter. This machine, which is made by the Great Western Mfg. Co., of Leavenworth, Kan., is operated on an eccentric which throws the sand around in a vessel of which the bottom is a screen.

The use of the multi-core scheme, that is, the method of casting several pieces together, reduces the space required in pouring the metal and also reduces the number of men necessary to make the castings for any given carbureter output. After the castings are made they are cut apart on a vertical sheer and the strip metal which forms the webs between the different castings is remelted. During the remelting process only 1 per cent. is lost, and about 10 per cent. of the metal used in making castings is remelted. This 10 per cent. is made up of the metal which composes the webs and also the other wasted metal.

Another point of economy in the casting operation is the use of producer gas in the melting furnaces. There are four of these furnaces, and they burn the Pocahontas bituminous coal, which costs about $3.45 a ton delivered.

After the castings have cooled they are brought upstairs on an elevator, which is devoted entirely to the carrying of these castings. From the elevator they are carried to the floor, which is shown in the diagram, and thence passed to a castings cleaning room. From this room they go to the stockroom where they are placed in numbered bins to await the call of an order.



A shipping room study—At left the individual shipping bench; at right, shipping room table where boy makes shipping boxes

Racing Car Development Has Been Slow

The Automobile Engineers' Forum

Car Designers Have Failed to Profit by Mechanical Experience Gained by Manufacturers in Other Lines of Work

DETROIT, MICH., Editor THE AUTOMOBILE:—The 500-mile race just passed brings abruptly to attention once more the exclamation "How rapid and how wonderful has been the development of the automobile?" This little rhetorical question has been asked every time a new model has been brought out and every time a racing car has set a new record.

Just now everybody is talking about the performance of the little Peugeot, because with a piston displacement of only 183 cubic inches it distanced all but one of the cars, all of which were much larger. It is hailed as an engineering wonder and looked upon with awe by the layman. The winning car is also pronounced a triumph of mechanical skill. The size of motor on the winner was only that to be found on the average $1,500 five-passenger touring car. Its displacement is 341.7 cubic inches

No Engineering Development Shown

However, without trying to be pessimistic, I would like to call into question the idea that these cars show any surprising development. They do show development in the automobile field but not in the engineering field. There is nothing startling in the fact that it is possible for a car with 183 cubic inches piston displacement being capable of upwards of 95 miles per hour or one with 341 cubic inches being capable of approximately 120 miles per hour. The surprising fact is that automobile manufacturers have been so slow in producing motors of these efficiencies. Almost the only excuse for a car such as the 3-liter Peugeot not being produced 10 years ago is the fact that men who had had a broad engineering experience were not engaged in the automobile business at that time, for the improvements of the past decade are due merely to an application of principles that were then common knowledge in other branches of machinery production.

Makers Were Mere Experimenters

It is a safe statement to make that the development of the automobile, both in racing and touring varieties, has not been rapid, but slow, due to the fact that those actively engaged in its production were mere experimenters and had nothing but their own experience in manufacturing automobiles to guide them.

This is easily proven by referring to the high-speed motors that are becoming so popular, not only for racing, but for pleasure cars. The main distinguishing features of these motors are: Higher piston and rotative speeds due to lighter reciprocating parts and perfect balance of these parts; higher volumetric efficiency due to larger valve openings and improved timing methods; stronger materials and more careful workmanship; better cooling; improved lubrication, carburetion and ignition.

Recognized Principles Have Been Followed

Let us take these up in order. The necessity of light reciprocating parts and the fact that vibration is the limiting factor in determining the speed that any kind of a machine can be run at has been known for years,—long before the automobile came into prominence. It was a recognized principle in the design of all kinds of machinery from textile machinery to locomotives. Yet it is only within the last 5 years that great care has been exercised in cutting down the weights of reciprocating parts and balancing them perfectly so that the maximum speed might be increased.

That high volumetric efficiency could only be obtained by making the valve openings large and by carefully timing the valves has only been appreciated to the fullest extent within the last 2 or 3 years if the most advanced designs of racing cars are any criterion. Nevertheless it has been recognized in air compressor practice for years that volumetric efficiency could only be obtained by exceptionally large valve openings and also by properly timed valves where automatic valves are not used. The relation between the flow of gases in an automobile motor and the flow of air in a compressor is very close and the lessons and the experience of the air compressor manufacturers should have gone a long ways towards helping the automobile makers of a few years ago to improve the efficiency of their racing and pleasure car motors, but it did not. The designers of automobiles had never had any experience with air-compressor design, their experience being limited to the automobile field. In other words, they were self-taught.

Wind Resistance Has Been Neglected

Another fact that goes to prove that, in the past, designers have been lacking in mechanical experience, is the development of the streamline body. It is only within the last few months, almost, that extremely narrow hoods, pointed radiators and tapering rears have been used to any extent and even now there are many makers that refuse to acknowledge the importance of cutting head resistance to the minimum. The excellent showing of racing cars with small motors has been due just as much to the cutting down of this resistance as to the increase in motor efficiency. But the surprising circumstance is that there are still many makers that refuse to produce a car that will cut the air instead of pushing it aside, that there are still many makers that would rather increase the power of the motor than decrease the resistance offered to it.

Neglect of Simple Engineering Facts

Surprising it is that it has been known ever since the advent of the automobile that the largest power consumer at anything above normal speed was the air itself, and yet makers have vied with each other in producing motors of extreme power when they could have obtained the same result by reducing the resistance. These same makers adopted ball bearings to reduce bearing friction but they overlooked the air. Surely this is a certain indication that they did not thoroughly appreciate the conditions they had to meet but that their designs were haphazard. It was not until the cleverest of them took the trouble to analyze the conditions under which a racing car operates and tried to determine the percentages of power that were consumed in each way

that the importance of simply streamlining the car and cutting down the wind resistance was appreciated. The matter of minimizing wind resistance is too simple a proposition to appeal to most manufacturers.

Automobile Development Rather Slow

Similar facts can be brought up concerning carburetion and ignition, and better cooling and lubrication were easily attained when the proportions were made sufficiently large.

Therefore, considering the advanced state of the mechanical arts at the time the automobile first started on the road to popularity, it is surprising that it has taken as long as it has to bring the automobile to its present perfection and this is only to be explained by the fact that the lessons that had already been learned in other fields of activity were not known or not taken advantage of.—R. F. COUGLAN, M.E.

Self-Starters Will Be Adopted as Standard Racing Equipment

NEW YORK CITY—Editor THE AUTOMOBILE:—One interesting development in racing car construction that can be looked for with certainty in the near future is the adoption of the self-starter. Startling as this prediction may seem, its use will gradually become common and racing drivers will wonder why they ever dared do without it.

The use of the self-starter will save many precious minutes when a balky motor is to be cranked and in these days a few minutes often means the loss of a race so keen is the competition.

In the Indianapolis race last week, one car lost several minutes near the end of the race and was forced to drop back several places just because the motor was hard to start.

Last fall in the race at Le Mans, France, Bablot, in the Delage, nearly lost the race by having trouble in starting the motor after changing tires when he was in the lead. It took over 10 minutes to get the motor going again and meantime a Mercedes had forged ahead. It was only by the most daring variety of driving that he again attained first place.

Endless examples of races where this has happened could be given if it were worth the trouble but it is not necessary to supply this proof because it is fairly obvious that the self-starter is coming to be a necessity on a racing car and I believe that it will not be over 5 years before they have been universally adopted.

There is little objection as far as the weight is concerned because a few pounds weight is not an important factor in a racing machine.—CARL S. TAYLOR.

Indianapolis Turns Should Be Banked for the Safety of Drivers

BRIDGEPORT, CONN.—Editor THE AUTOMOBILE:—Racing at best is such a dangerous occupation that anything that can be accomplished to make it safer should be done.

There is one thing that impressed me at Indianapolis, and that is the fact that the cars had to take the comparatively sharp slightly banked turns at high rates of speed. All the accidents occurred on the turns, and while there were no fatalities, this was, itself, merely a happy accident. It is a shame that a race of this character should be run on a track that has no more provision for taking the turns safely than this one had. These curves should be inclined so that a car could traverse them at from 90 to 100 miles per hour without skidding, the same as can be done on the Brooklands track in England. It would not cost a great deal of money to bank these turns properly, certainly a very small amount in proportion to the total cost of the track. If this were done the course would not only be rendered safer but it would bring more interest into the race because higher rates of speed could be maintained and there would be less time out due to tire trouble.

All these facts indicate that it would be well worth while to make the track as safe as possible in this particular.—K. H. K.

Decisions of the Courts—Repairman Loses Case

COURT holds that the fact that a repairman has done insufficient work and charged excessive prices, cannot be shown in a case where a repairman sues to recover for work, labor and services and materials.

A repairman sued for $445.39 for supplies and repairs to an automobile. That amount was recovered but the higher court said that it should not have been allowed, as the correctness of an account for supplies and labor cannot be proved by a witness who does not make the entries or who has no personal knowledge and that a superintendent of a repair shop cannot prove the time slips, even though the men under him made them out, signed and delivered them to him and he took them to the office, but that the time slips of mechanics can only be admitted in court when they testify that they are correct, when the shop books or the bookkeeper cannot be reached. If the foreman had signed the slips or if he had personal knowledge of the items of time and labor they contained, then, of course, they could have been put in evidence.—*Randle vs. Barden*, 164 *S. W.* (*Texas*) 1063.

$3,500 Not Too High Damages

Court holds that a street sweeper, standing in the center of the street, talking to a friend, who had stopped his wagon, was not so negligent as to be barred from recovering for injuries when run down by an automobile.

A street sweeper was talking with a friend in the center of a street in St. Louis, when an automobile backed out of a garage, crossed the sidewalk, curved around backward in the street and ran over him. The car had its top up and it circled into the middle of the street without the chauffeur looking in back of him. The court held that this was such negligence on the part of the chauffeur as would allow the street sweeper to recover money damages for his injuries and held that a judgment of $3,500 for a broken nose, wounded head, side and knee was not too much.—*Ostermeier vs. Kingman, St. Louis Implement Co.*, 164 *S. W.* (*Mo.*) 218.

Longshoreman Recovers $1,000

Court says that when a longshoreman loses $200 in wages and has to pay a doctor's bill of $75 and earns only $5 after the accident, when he earned $15 before, a verdict of $1,000 against the company owning a taxicab which ran down and injured him is not too much.

A longshoreman was crossing a street in the City of Seattle. Before leaving the curb he saw a taxicab about a block away. He proceeded to cross and did not look for the taxi again. He was run down and injured and the jury gave him a verdict of $1,000 against the taxicab company. The court held that this verdict was not excessive and said it was up to the jury to decide whether he was negligent enough to prevent him from recovering anything when he saw the taxi a block away and did not give it any further attention.—*Chase vs. Seattle Taxicab & Transfer Co.*, 139 *Pac.* (*Washington*) 499.

Car, Truck and Accessory Plants Plan Increase Production

Ford Business Particularly Bright in Foreign Countries—Many Dealers Appointed—Oldsmobile Six Is Breaking Sales Records—British Maker in America for Motors

Part V

NEW YORK CITY, June 6—Reports from automobile, truck and accessory factories in Detroit and other centers of the industry continue to point to a record-breaking year. Practically all the factories are working to capacity and some are busy overtime. It is significant that the designer of a new low-priced English car has come to America for his motors. Latest reports to be made are as follows:

U Motors for $500 British Car

DETROIT, MICH., June 5—As announced in THE AUTOMOBILE for May 28, an order for 5,000 motors has recently been placed with the Continental Motor Mfg. Co., of this city, by the W. R. M. Motors, Ltd., of Oxford, Eng.

W. R. Morris, of the British firm, has been in Detroit and Muskegon, at the Continental plants, for the last 2 months with a staff of engineers which he brought with him from England, and has been supervising and looking after the details during the construction of the first motors. These are known as model U and are a new type in American manufacture, the features being 2¾ inches bore, 4 inches stroke, crankcase and cylinders cast in one piece, force feed lubrication, aluminum oil pan, three bearing crankshaft. The motors will be used in the Morris-Oxford cars, which are made by the British concern, and which are to be sold at £100 or about $500.

In speaking about the deal, Mr. Morris said: "I shall fight the American invasion with American methods. It is folly to try and meet it in any other way. British cars built in accordance with British traditions are mechanical masterpieces, better perhaps on the average than American cars, but they are helpless against the American type, for no British or European manufacturer is producing cars in quantity, and 300 motors of any one type is considered a big output for a European company, while it is less than 2 days' production for a concern like the Continental. The European method is that of the workshop rather than that of the factory, paying much attention to details, painstaking to a fault, but exceedingly slow. Standardization in the American sense is practically unknown. Parts are fitted by hand rather than machined to fit, and necessarily, the motor produced in this expensive way costs double what the American motor costs. Since the motor represents the largest single item of cost in the making of a car, it is easy to see why the British manufacturer has been unable to compete with the medium-priced imported cars."

The plant of the W. R. M. Motors, Ltd., at Oxford, has facilities to assemble about 100 cars weekly, but this capacity will probably soon be increased.

Ford Gains in Europe

DETROIT, MICH, June 5—"The Continental business of the Ford company has never been so flourishing and the outlook for the future as bright," said H. P. White, continental manager for the Ford concern, with headquarters in Paris, when seen at the Ford plant today.

"During the last 18 months we have made arrangements with about 125 dealers throughout France to handle the Ford cars and some of these dealers are handling at the same time cars which cost about six to eight times as much as the Ford. Take, for instance, the Lyons dealer. He is the agent for the Rolls-Royce, which is not only the most expensive car made in Great Britain but one of the highest-priced automobiles made in the world. This dealer has a very fine trade, in fact, the wealthiest people of the city and surrounding country, and he would not have taken the Ford agency if he did not think it is a good car.

"The prejudice against the low-priced American car, the knocking of former years, is now a matter of history. Ford cars have demonstrated so significantly that they are as good and a good deal better than a great many much higher-priced cars of European construction that the people no longer believe in the anti-American automobile campaigns which some papers have been keeping up.

"The best evidences of our success are the facts and I may state that there are now close to 5,000 Ford cars owned in France, and this is a pretty good showing when you take into consideration that our business was started in France only in December, 1907, on a small scale. During May of this year we disposed of 500 Fords and we are only starting to really do business as we want to do it.

"In Paris we have our branch house but there are twenty-five Ford dealers in the Seine department, including Paris and its suburbs. All these dealers work the way they think best to our mutual advantage. There is no territorial restriction, the dealers going after business wherever they think they may be able to sell a car. We concluded arrangements recently with Henry Farman, who may be considered the largest automobile dealer in Paris.

"In Marseilles, southern France, our agent is Bablot, the famous Delage racing driver. He has ordered 200 Fords.

No Real Competition

"Competition with the moderate-priced French cars really does not exist as a French car of the same value or standard as the Ford cannot be bought for less than $1,500, which is $700 more than the price of our car, and which means that you could practically buy two cars for the same price.

"Business all over the continent has been exceptionally good. In Russia we disposed of 1,250 cars between October, 1913, and December, 1913. In Germany

we sold 750 cars last year. The Belgian business during the past year amounted to 275 to 300 Fords, while in Holland some 150 to 200 cars were sold.

"We now have, in addition to our warehouse or service depot in Hamburg, twenty-five dealers in Germany, and are looking forward to a big season. In Russia conditions are also very encouraging and we are getting a big share of the automobile business, although it has not been an easy matter to overcome the prejudice of the Russians against American cars. The cars we sell in Russia or in Holland or anywhere else are absolute duplicates of those which are sold by the Ford organization in the United States."

Olds Six Is Selling Fast

Sales Manager J. V. Hall, of the Olds Motor Works, Lansing, Mich., says that the success of the new model 42 Oldsmobile, the little six, is so great that when the publicity campaign is started the first of August, it is anticipated that more orders will be coming in than the Olds Motor Works ever had, even in the days of their successful curved dash runabout. The most remarkable side of the matter is that 75 per cent. of the dealers have not seen Model 42, but have been ordering when they learned that it was an exact reproduction of the big six, only weighing under 2,600 pounds and selling for $1,350.

Paige Opposed to Branches

The Paige-Detroit Motor Car Co., of Detroit, is decidedly opposed to branch houses and one-car dealers. "We have no branch houses and will not operate any," says Henry Krohn, sales manager of the company. "In many instances branch houses have been more or less of a dumping ground for factory product. They have in some cases encouraged unfair competition because prices were not strictly maintained. Enormous trade allowances have been made for second-hand cars, which generates a type of competition that the legitimate dealer cannot meet. We believe that for most grades of cars branch houses are an unsatisfactory and expensive proposition. As for the one-car dealer, who is often no dealer at all, here is an example. A Mr. Jones, in Punkville, writes to the factory that he does not want a contract for any specific number of cars, but wants a car for his own use and knows he can sell quite a few others if he can get the agents' discount. Some manufacturers have accepted such propositions although this man Jones is not a dealer and does not depend on the automobile for a livelihood. He hears, however, occasionally of a friend who is going to buy a car and tells his friend he is in a position to get a little extra discount and will sell him a car at somewhat better than list price. The result is a cut-price reputation for the factory and a lost sale for some legitimate dealer. The Paige company is absolutely opposed to this kind of business and never will tolerate the illegitimate dealer."

Weston-Mott Breaking Records

The Weston-Mott company, Flint, Mich., is closing a very successful year of parts making, the volume of its business being greater than ever in the history of the concern. Not only does this Weston-Mott company supply axles, rims and hubs to car manufacturers in the General Motors group, of which it is a part, but it also does a big business with outside concerns.

Increases in all departments are in vogue for the coming year to take care of more business. These increases do not refer to enlargements of plant but rather to more efficient manufacturing methods and increased equipment. In a word, manufacturing efficiency is to be brought down to a finer basis than ever and this is looked to to take care of increases in production. At this plant, as well as all others, in the General Motors group, there seems to be no reduction of employees except in the interests of increased efficiency and following the natural cleaning up of schedules for the year.

Lewis Spring & Axle in Good Shape

Murry Irwin, sales manager of the Lewis Spring & Axle Co., Jackson, did not feel that his concern could at this time furnish any substantial information relative to conditions, although business is in the best of shape. Due to a radical change in product he preferred not to go into details. He stated, however, his belief that conditions for the coming year are exceptionally bright and that the season is finishing in very strong shape.

Champion Ignition Plant Busy

The Champion Ignition Co., Flint, Mich., one of the General Motors group and devoted exclusively to the manufacture of spark plugs, had a very good year. This concern supplies many outside companies with its product as well as General Motors companies, and since nearly all of its customers have been exceedingly prosperous its business has fared correspondingly well.

The Champion Ignition Co. manufactures a full and varied line of spark plugs and has perhaps one of the most efficient plants in its line of business. Every feature of production has been figured to its highest efficiency basis, and this policy, along with the solid selling force, is responsible for a large output from a comparatively small plant.

Germans Investigate Sicily as a Car Market

BERLIN, GERMANY, May 29—The German consul in Palermo, Sicily, recently made an investigation about the possibilities of extending the German automobile business in the big Italian island.

There are about 3,650,000 inhabitants in Sicily and of this number 850,000 reside in the capital, Palermo. All told, there are now about 350 touring or pleasure vehicles in operation in Palermo and about thirty-five commercial and industrial vehicles. Of these 380 cars, 250 to 300 are of Italian construction, about 50 came from France, about 25 came from Germany and the rest came from the United States and Belgium, the American cars being the Ford and Hupmobile. The majority of the Italian cars are Fiat, Lancia and Isotta, while most of the French cars are De Dion-Bouton.

The development of the automobile business has been very slow because the roads are generally bad and because the average Sicilian who could afford an automobile prefers horse and carriage. In the city of Palermo there are now more than 2,500 owners of horses and carriages and there are about 1,600 cabs in daily operation.

The average automobile sold is a six-passenger, four-cylinder car of from 20 to 24 horsepower, and weighing about a ton. Most of the commercial cars are of the four-cylinder type, of 10 to 14 horsepower. There are about twenty motor buses in operation throughout the island having an average passenger carrying capacity of 18 and of 35 horsepower.

There is, however, no doubt that in time a large automobile business will be done, not only in Palermo, but in the entire island. If a concern would start into the business with plenty of capital, and with men who could show the Sicilians all the advantages of the automobile over the horse-drawn vehicle and if such a concern could have an imposing number of different cars, a full line of various sizes, horsepower, prices, it will result in business.

The sale of chassis only is almost unknown, the automobiles being mostly sold completely equipped.

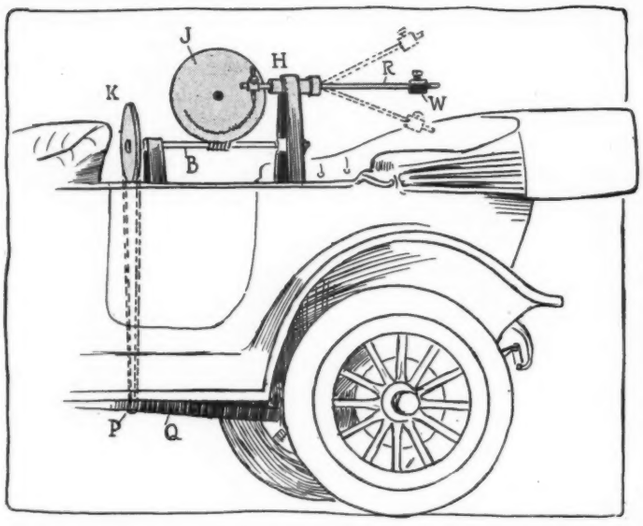


Fig. 1—Inertia type of shock recorder installed in a car for the purpose of testing the shock absorbers

The Rostrum

Says Pump Trouble Is Caused by Galvanic Action

EDITOR THE AUTOMOBILE:—Following the suggestion of R. F. Chapman in his letter in the Rostrum of THE AUTOMOBILE for April 16, 1914, I would like to criticise some of the details and the arrangement of modern cars of various makes.

All modern cars, to my knowledge, which employ a water circulating pump use a steel shaft, a cast-iron runner and a steel pin. I consider this a grave mistake for this reason. The steel shaft and pin undergo a galvanic action, which rusts them away rapidly, the pump will begin to leak around packing, which is of minor importance, although annoying, but the pin will rust until it breaks, consequently, the runner will stop turning and cease to circulate the water.

Now I dare to say nine repairmen out of ten will look for the trouble in other places. Boiling of the water and considerable overheating of the engine results. It is quite a job to replace a new pin, when the real cause has been found.

I have overcome this trouble, on cars which I repaired, by doing away with the steel entirely, that is, I used either a brass pin and brass pump shaft, or if the shaft were used in connection with a starter I used a brass pin only and I have found it a very satisfactory repair.

I think if the makers would employ brass in the manner I described in these pumps, it would save some owners lots of trouble and money.

One Maker Places Tank Too Low

Another maker of this year's cars in order to get a low comfortable cushion, has placed the gasoline tank low, so that if I had a half empty tank I could not go over any steep grades. Finally, I decided to stop this by making the cover air-tight, and then I soldered a bicycle valve in it and forced the gasoline to the carbureter under air pressure. I had no further trouble in climbing hills. I do not see how the maker could have overlooked this important feature, as a driver can get in serious trouble if an engine goes dead on a hill.

Del Monte, Cal. FRANK H. LUMPE.

Iron Shrinks on Solidifying

Editor THE AUTOMOBILE:—In a standard text book on physics I noticed the following article which came under the heading, Change of Volume on Freezing.

"Most substances contract on freezing, the solid sinking in the liquid. The fact that iron, bismuth, antimony and some alloys such as type-metal (lead, antimony, and tin) expand on solidifying is valuable industrially, since when cast, they take a particularly sharp impression of the mold."

I have always been under the impression that iron when cast shrank and that this had to be taken into account in making all castings. Could you kindly inform me as to which is right.

Mt. Vernon, N. Y. E. H. B.

—Your impression is correct and the book is in error, iron contracts on cooling. The shrinkage is increased by the presence of sulphur, manganese, or combined carbon and reduced by silicon, phosphorus, or graphitic carbon.

A Shock Recorder Based on Inertia

Editor THE AUTOMOBILE:—In the May 21 issue of THE AUTOMOBILE a device for taking records of shock absorber efficiency, designed by Mr. C. H. de La Monte, came to my notice.

This device is doubtless very efficient in doing what it is intended to do, but is the motion of the axle relative to the frame or body of the car what is wanted by the automobile owner in testing the merits of the various shock absorbers?

The writer's experience along this line has led to an endeavor to take records of body movements which directly effect the comfort or discomfort of the occupants of the car.

A device used in accomplishing this is shown in Figs. 1, 2 and 3. Referring to Fig. 1 the recording chart blank is pinned to the circular plate J which has worm teeth in its face engaging into worm B and is driven by a round belt running in sheave wheel K and pulley P which is attached to drive shaft Q.

This method of rotating the chart plate insures a speed relative to the speed of the car. The pen pulsations are produced by the rod R which is provided with a weight W for delicate balancing adjustment. Fig. 2 is an enlarged part sectional view of the pen mechanism in which A is a cylinder wherein the piston and rod B are held. Compression spring C tends to hold the piston towards the rod head D which is held in the tube A by the threaded cap E. Head D is crowned on the face to permit swinging in any direction

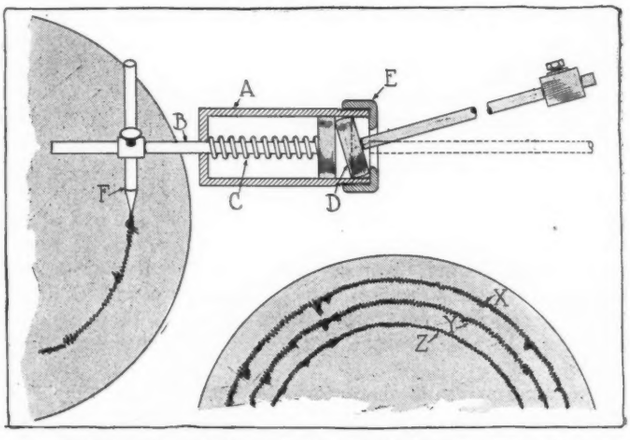


Fig. 2—Upper—Complete recording mechanism. Fig. 3—Lower—Chart with record of three separate tests on it

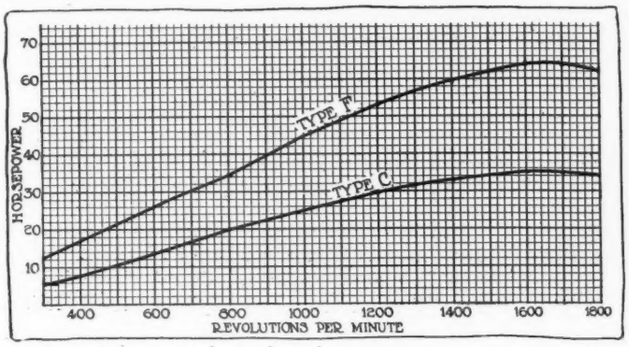


Fig. 4—Horsepower curves of Wisconsin motors, types F and C

without binding on the interior of the tube, yet without lost motion and driving the piston to and fro thus actuating the pen F. When there is no body vibrations the head D is pressed squarely against cap E as shown by the broken lines.

In Fig. 3 are shown three records made by the instrument. The one marked A was taken while the car was driven 15 miles per hour over a stretch of selected road and without shock absorbers; B record was taken while car was driven over the same stretch of road and at the same speed as when test A was made. This time a well known friction shock absorber was used on the rear of car.

Record marked C was taken under similar conditions as A and B but an experimental shock-absorber was used on rear of car only.

Lancaster, Pa. E. H. KREIDER.

Horsepower Curves of Wisconsin Motors

Editor THE AUTOMOBILE:—Will you please publish the horsepower curves of the type C and F Wisconsin motors, and in addition give the bores and strokes?

New York City. K. H. K.

Horsepower curves of the Wisconsin motors, models C and F are shown in Fig. 4. The former is a four-cylinder L-head block design with bore and stroke of 4.25 by 5 inches, while the latter is a six-cylinder, 3.75 by 5 inches, the cylinders being T-head constructions cast in pairs.

Claims New Muffler Design Old

Editor THE AUTOMOBILE:—On page 1020 of the May 14 issue of THE AUTOMOBILE, is described a muffler, Fig. 8, by S. D. Waldon. Twenty years ago Mr. H. H. Westinghouse, of the Westinghouse Air Brake Co., suggested a form of muffler to me, like Waldon's, for exhaust of high speed steam engines. I built dozens of them and they worked perfectly. High speed automatic cut-off engines, non-condensing, equipped with these mufflers, were practically noiseless in their exhausts.

There is one question I would like to ask and that is, "Why does Mr. Waldon line his outer casing with asbestos?" Why not let the iron conduct quickly by omitting the asbestos?

Philadelphia, Pa. M. R. MUCKLE, JR.

How to Drive a Ford

Editor THE AUTOMOBILE:—1—Will you kindly explain the entire speed control of the Ford automobile.

2—Sketch the form of the working of the transmission.

3—Are any Ford cars furnished with demountable rim wheels?

Milltown, N. J. P. E. ZENEWICH.

—1—A planetary transmision is used on the Ford. The complete control consists of one side lever, three pedals and spark and throttle levers under the wheel.

Let us consider the pedals first. The first one toward the left marked C operates the clutch and by it the car is started and its operation largely controlled. After the engine is running free, a gentle pressure forward on this pedal, with the left foot, will set the car in motion, by engaging the low-speed gear. When this pedal is pushed forward, the hand lever at the left should also be pushed as far forward as possible, so that the pedal may return to high when the car is under way.

Pedal C also operates the high-speed clutch.

After the hand lever has been pushed forward and the car is well under motion, the releasing of this pedal by the foot engages the high-speed clutch. The engine is then delivering its power through the driveshaft to the rear wheels of the car. In low speed the engine does not work directly upon the rear wheels but through the transmission exerts a leverage.

By holding this pedal C half-way between the high and low speed, the engine is released from the propeller shaft and the power is removed from the rear wheels. Of course, this pedal must be held in neutral when the foot brake pedal B is applied and the car is stopped or its speed materially slackened. The clutch is held in neutral by the hand lever, that is, the hand lever holds the pedal half way between high and low speeds exactly where the foot holds it when the car is being operated.

The pedal marked B is the brake pedal which operates by means of a tightening band upon the brake drum, and the pedal marked R operates the reverse clutch. To reverse, the car must be brought to a dead stop. With the engine running, disengage the clutch with the hand lever and press the reverse pedal forward with the left foot, leaving the right foot free to use on the brake pedal if needed. Do not bring the hand lever back too far or you will set the brakes on the rear wheels. Experienced drivers ordinarily reverse the car by simply holding the clutch pedal in neutral with the left foot, and operating the reverse pedal with the right.

The hand lever at the driver's left is to hold the clutch in neutral. If it were not for this lever the driver would have to stop his engine when he got out of his car for there would be no means of holding the clutch so that the engine might run free. This lever must always be in a vertical position when the car is at rest in starting and in reversing. Pulled back as far as it will go, it acts as an emergency brake by expanding the iron brake shoes within the rear wheel drums. Care should be taken not to pull back the hand lever too far when the car is to be reversed. It should merely come back far enough to hold the clutch in neutral and it should always be pushed well forward when the car is under way or the clutch will slip when in high gear.

2—A sectional view of the Ford planetary set is shown in

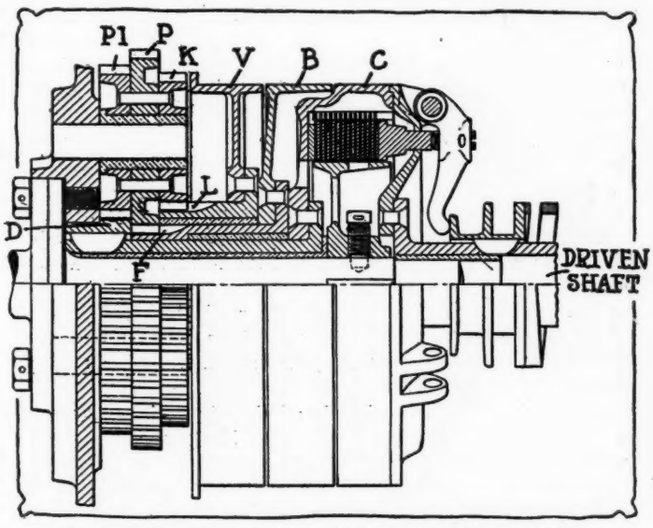


Fig. 5—Part section through Ford planetary transmission

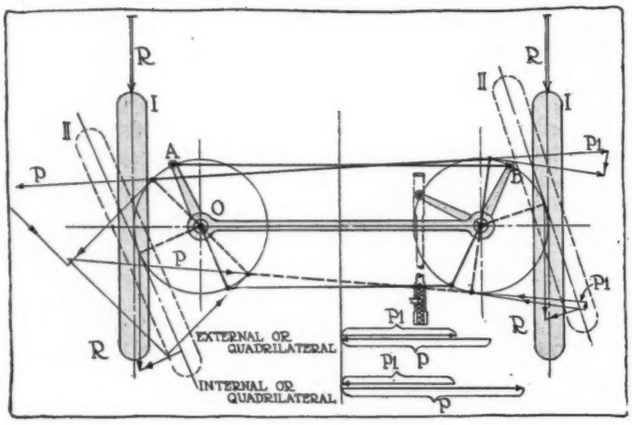


Fig. 6—Illustrating parallel versus angular setting of front wheels

Fig. 5. The driven gear is shown at D. By pressing the low-speed pedal a brake is applied to the drum B, and by doing this the gear F is held stationary and the pinion P rolls upon it. The pinion P1 causes the gear B to turn slowly, which constitutes slow speed. For high speed the whole mechanism is locked by means of the clutch drum C, and the planetary set turns around, but none of the internal parts of it revolve. For the reverse, a brake band is applied to the drum V. This holds the gear L stationary and the pinion K rolls upon it and the pinion P1 causes B to move in the reverse direction.

3—Ford cars are not furnished with demountable rims but there are many concerns that make such rims especially for these machines and sell them at a very reasonable figure, generally ranging between $25 and $30.

Why Wheels Are Toed or Gathered

Editor THE AUTOMOBILE:—1—Please explain why the front wheels toe in slightly and why they should not be set exactly parallel. I should think there would be slight tire wear caused by the tires not running straight ahead when the front wheels toe in.

2—About what voltage is given by a good magneto at low engine speed, at high engine speed? What voltage from H. T. coil properly adjusted?

Binghamton, N. Y. H. P. L.

—1—The toeing-in of the front wheels is for the purpose of obtaining an easier action of the steering gear when rounding corners. When the car is traveling straight ahead it matters not whether the wheels are parallel or gathered but when a turn is reached, if the wheels are parallel, the tendency of the wheels is to increase the angle and therefore when the course of the car is to be straightened an extra effort is required. It has been found that this difficulty can be overcome by toeing-in the wheels because when this is done the slant of the front wheels creates a force that balances this other tendency.

Gathering the wheels does increase tire wear slightly but the angle at which the wheels are set is so small that this objection can be neglected.

The angularity is very small, the angle included by both wheels being no more than from 5 to 7 degrees; and this undoubtedly accounts for this practice remaining often unnoticed or undetected.

The modern motor vehicle is admittedly designed on compromises. Some of these nearly give ideal conditions, while others would barely stand a close investigation. Regarded from this standpoint it will serve to examine the behavior of both systems of setting the steering wheels, and with a view to ascertain whether it would be possible to arrive at a compromise which would embrace the advantages of both systems, and reduce, if not eliminate, their respective drawbacks.

Parallel Versus Angular Setting Analyzed

Referring to Fig. 6, both wheels which are parallel, are shown with the quadrilateral O A B O in the neutral position I, while the car itself is supposed to be traveling in the direction of the arrow, overcoming a certain resistance R, acting in the axis of the vehicle and equally distributed between the two wheels. These two forces, however slight they may be, being transmitted through spindle and lever to the tie-rod, and the two components lying in its direction, are obviously neutralized.

Let us now suppose that the wheels be moved from position I into position II, and the same resistance R be acting again in the axis of the vehicle. Both these forces R, are supposed equal, the angles to which the wheels are locked being taken very small; they, therefore, need not be specially inquired into and can be represented by the length R.

It is easy to resolve this force into two components, one of them in the direction of the wheel axle, and taken up by the steering pivot, and the other at right angles to the first. If, for the sake of simplicity, the wheels are supposed not to be splayed, and, moreover, the distance between center of wheel and center of pivot be equal the length of steering arm, the component of R at right angles to the spindle, will be found again at the end of the steering arm and perpendicular to it. Here this component is resolved into two others; one in the direction of the steering arm, and taken up by the pivot, the other lying in the direction of the tie bar, tending to pull this over the left. Let the component in this direction be called P.

For the steering to be in a condition of equilibrium, it is obviously imperative that this force P be destroyed by another equal force acting also on the tie-bar, but in the opposite direction. By applying the procedure just described to the other wheel, whose position is determined through the assumed quadrilateral, it will be found that not only is the corresponding component force P1, in the tie rod, different from P, but, and this is the serious point, it is also to a markedly smaller amount. In this connection it should be pointed out that for the purpose of showing better this peculiar behavior, the quadrilateral has an exaggerated angularity, and the angles of lock shown could only be obtained with a considerable movement of the steering wheel. Nevertheless, the diagram shows that the arrangement is not in a state of stable equilibrium.

A solution of the angularity difficulty is shown in Fig. 7. It will readily be seen that, owing to the wheels being not parallel their motion is of a mixed rolling and sliding character. When driving straight along with the wheels in the

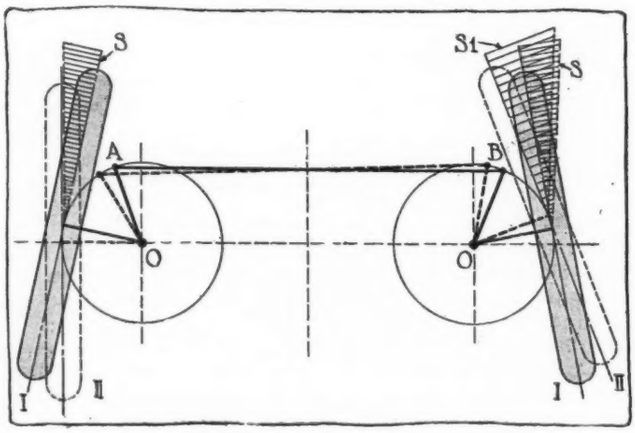


Fig. 7—Illustrating compromise setting of the wheels

neutral position, the amount of work corresponding to the sliding motion is obviously equal for both wheels, being mainly dependent upon the angle they enclose. It can therefore be assumed proportional to the surfaces S, S. If the wheels be moved from position I into position II, the work S of the leading wheel is reduced from S to 0, while for the other it increases from S to S1, that is to say, for a certain lock the off-side wheel has to overcome a much greater resistance; it opposes, therefore, to an increase of the angularity, and tends to bring back the wheels to their neutral position. This steering is positively stable; a shock which would produce a certain lock at one wheel has also to overcome the increased work of friction of the other wheel; that is, the force of impact will never produce any considerable angle at one wheel and even if that could happen the steering would at once right itself. A car, when going at a good speed, would always keep its direction even in case the steering arrangement should become valueless.

2—The voltage of the ordinary magneto varies between 5,000 and 12,000 while that of a high-tension coil connected to a battery is roughly 8,000. All these figures depend on a great many things and cannot be considered as final. The speed of the motor, the compression, the size of the spark gap and the design of the instrument all affect the voltage of the magneto, while the voltage of the spark coil depends on the same factors with the exception of motor speed.

How to Make an Emergency Spark Plug

Editor THE AUTOMOBILE:—A nifty amateur's scheme for making spark plugs in a jiffy that will work unless they get too hot is shown in Fig. 9. The spark plug is made of common white metal with a comparatively low melting point, a porcelain tube such as is used in house wiring, and copper wire. The casting is made in one fell swoop, as the drawing indicates, right in the valve cap.

In a pinch, such a plug as this will work very well, although, to be sure, it should be supplanted by a regular make as soon as possible.

New York, N. Y. W. F. SCHAPHORST.

Questions Concerning Regal Underslung

Editor THE AUTOMOBILE:—1.—Can you give me the wheelbase of the 1913 Regal underslung?

2.—Width of frame?

3.—Dimensions from frame to ground taken at the center of the car?

4.—Bore and stroke, horsepower?

5.—Is cylinder L or T-type?

6.—Could the cylinders be rebored to a larger dimension, if so what is the extent?

7.—Some information in regard to the Regal being cut down and made into a racing car?

Jamesburg, N. J. H. W. T.

—1.—The wheelbase of this car is 108 inches.

2.—The distance between the two channel members, measured from the outside, is 28.875 inches on all the models.

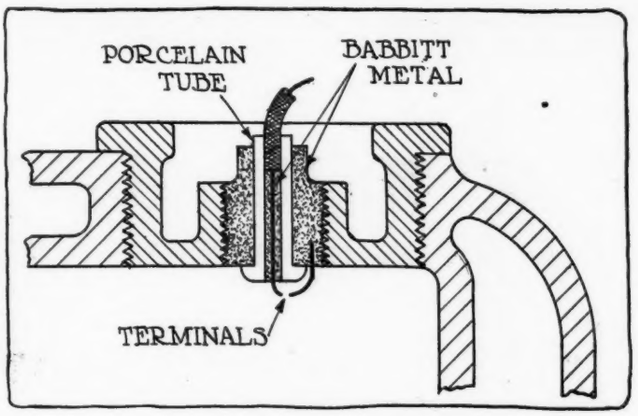


Fig. 9—Emergency spark plug construction

3.—The height of the frame above the ground is 12.5 inches.

4.—The cylinders measure 3.75 by 4.5 inches and the S. A. E. rating is 22.5.

5.—The cylinder is an L-type casting with the cylinders in a block.

6.—The cylinders may be rebored and larger pistons fitted if this is necessary. If the cylinders are worn out of round or are badly scored so that the compression is poor it will be necessary to regrind them. Only enough metal should be taken off to bring the cylinder to a true cylindrical shape. The usual amount removed is about .02. The maximum that can be ground off depends on the thickness of the cylinder and where it is badly worn it is necessary to remove as much as 1-16-inch.

7.—It is not advisable to turn any car into a racing machine because the extra strain imposed by the high speed and greater power developed shortens the life of the car considerably. However, if you desire to increase the speed of the machine, there are several things you can do. If you desire an increase of 5 or 10 miles per hour this can be obtained by merely lowering the gear ratio from 3.7 to 1 to about 3 to 1. At the same time it would be well to advance the setting of the magneto so that with the spark retarded, the breaker points separate when the piston reaches a point .5-inch below the top dead center.

If you intend to maintain a high speed for any length of time, you should add an auxiliary oiling system. Put a tank holding 3 or 4 gallons on the back of the machine and connect it with a pipe running to the crankcase. Then install an air pump on the dash within easy reach of both passengers and run an air line to the oil tank. Thus by operating the pump, oil is forced to the crankcase as needed.

If more speed than this is wanted a streamline body with a narrow radiator and hood should be fitted. Wind resistance takes most of the power at high speeds and the more the head resistance of the car is reduced the greater the speed.

You might also increase the lift of the valves slightly, probably 1-16 inch would be best, you might drill the pistons and change the valve timing by fitting a new camshaft but these changes would be expensive. However, it would be well to make sure that the pistons and the connecting-rods are of equal weight.

Remove material from the interior of the pistons until all four weigh the same. Do likewise with the connecting-rods.

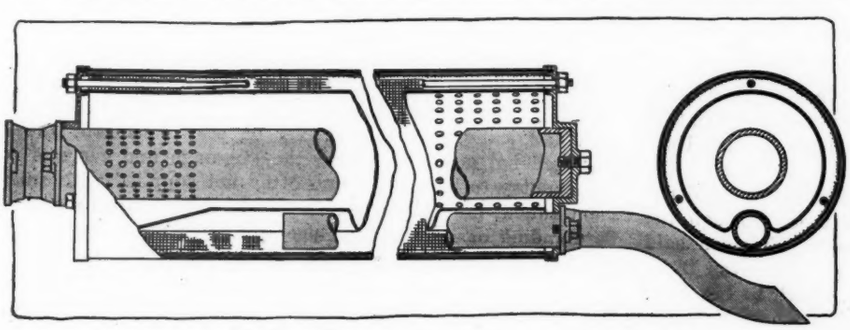


Fig. 8—Waldon's muffler that reader claims is an old design

Export Markets Are Neglected

A Fertile Field Uncultivated—Commission Houses Get Trade

By Federico Sarda
Export Department, Mitchell-Lewis Motor Co.

Left—Mitchell roadster being boxed at the factory. Note right hand drive, as required in England and her colonies. Right—Method of suspending Hupmobiles on special axle blocks designed by the company for packing cars to be exported

IN the American automobile business there is nothing as wonderful as the growth of export trade. Official statistics published in THE AUTOMOBILE for February 19 showed that 23,720 automobiles were exported during the year ending June 1, 1914. Including tires, repairs, and other supplies, the value of those automobile goods is nearly $40,000,000. America stands second only to France in the value of automobile exports, and if the percentage of increase continues it is likely to pass ahead this year; and yet, it was only a few years ago that automobile exports did not even deserve a separate heading in the official record.

The first American cars were bought abroad solely on account of their cheapness, and American manufacturers did not go after foreign buyers, but the foreign buyers went after the American manufacturers, who were apparently not anxious at all to sell their cars abroad.

Our High-Class Cars Gaining Abroad

These two features still prevail to a certain extent. The average value of each automobile exported last year—with the only exception of cars sent to Canada—is a little over $900, and but few high-class American cars have found their way to the favor of the foreign motorists. However, after the runabout, medium-priced cars were successfully introduced into the foreign markets, and there is hope that wealthy foreign buyers will soon appreciate more generally the qualities of the high-class American product.

Few Makers Work for Export Trade

Few of our makers have taken pains to get the foreign trade. Inquiries in a foreign language invariably went to the waste paper basket, and even those written in plain English hardly deserved better consideration. Nevertheless the foreign buyer knew what he wanted, and when he could not get cars from the factories he ordered them through his American connections. Not without reason, Emerson said that when a man has something better to offer, even if he lives in the woods, the public will make a path to his door. The first cheap cars introduced in foreign markets in the hands of incompetent owners and drivers, and cared for by men used to the more refined European construction, could not possibly make good, but automobile owners were not so particular at that time—a machine was just a luxury and novelty—and people kept right on demanding cars. Foreign orders began to pour in and practically in spite of the manufacturers' reluctance they had to give some attention to that foreign call. Low-priced cars were the only ones in demand, but after the business depression in 1907 makers of medium-priced cars thought that there might be something in foreign business after all, and, animated by a few inquiries they had received, they started to do some export advertising and possibly sent traveling men abroad. The foreign markets were eager to take up American automobiles, and those efforts, no matter how slight or misconducted, were bound to produce results.

Foreign lecturers, writers and business men, as well as American consuls—through the Daily Consular and Trade Reports—have been pointing out the blunders made by our manufacturers when looking for foreign markets. Insufficient postage to mail English literature to non-English territories or Spanish literature to English or German-speaking countries; lack of knowledge regarding time and distance and local conditions; to give quotations f. o. b. factory in American dollars with no information whatever about inland freight, insurance, etc.; lack of courtesy in the correspondence and dealings with the foreign buyers; to send out traveling men not acquainted with the language and customs of the country to be visited, and often not supplied with sufficient funds; late deliveries; failure to ship according to understanding or instructions; poor packing; requiring a contract for a number of cars in order to grant the agency; lack of care in making out invoices—these are a few of the grossest faults that hinder development of our trade, faults that are more important when considering the attention paid by

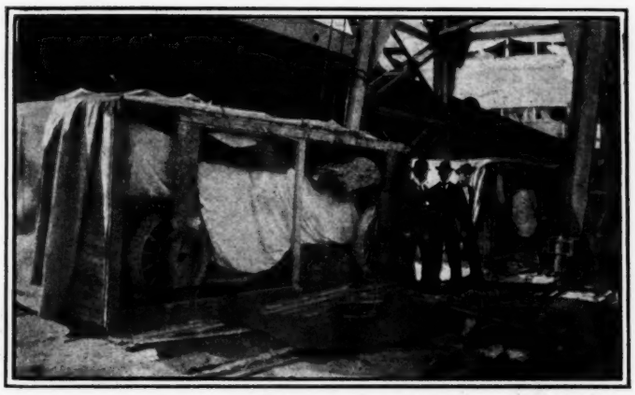
the European exporters to all of those details. If, in addition to errors of that magnitude, we take into consideration other handicaps, such as the lack of American banks abroad, unwillingness of American manufacturers to grant credits, the high rate of transportation for American goods shipped on non-American ships, it is easy to see that, on the whole, the success of the American cars in foreign countries is due to their sheer good quality and not to our selling abilities.

More Intelligence Required

Even those manufacturers that have taken some pains to build up an export business do not seem to think it necessary to bring as much intelligence to bear upon the task of acquiring foreign trade as they do upon the domestic trade, and in most cases the task is left to anybody in the office—the advertising man or an assistant sales manager, who has never been outside of the country and whose knowledge of foreign languages does not go further than "*wie geits*" and "*mañana*" and regards foreign business as a nuisance.

Those manufacturers that go to the length of employing a man that presumably knows something about his job will often spoil his work by overruling his good judgment on matters in which he is a master when his employer is hardly a novice.

Unsuitable advertising and literature is another handicap in promoting the foreign trade. Concerns that pay a high commission to an advertising agency for writing their copy will trust its translation to anybody who claims he can do the work. There are now several publicity concerns in the United States that issue export reviews in foreign languages, mostly in Spanish, and to anybody acquainted with that language their pages offer endless material for criticism. Spark-plug is almost always translated literally, with no meaning for the Spanish, French or Portuguese readers, as in these three languages the word corresponding to the English "candle" is the only rendering understandable to motorists. Wheelbase is generally interpreted as "base of the wheels," and but few foreign readers will ever be able to comprehend this as meaning the distance between the two points where the front and rear tires touch the ground, or the distance between the front and rear axles. The word "standard," so dear to American manufacturers, has several meanings in Spanish, and yet no one of them precisely expresses the idea conveyed when saying "standard automobiles" or "standard manufacturers." This difficulty increases when—as it is often the case—the original American copy is ornamented with slang, catch words, slogans and other clever trimmings. The educated translator can possibly find the Spanish or Russian equivalents for some phrases, but in most instances the words are individually translated according to the dictionary—which generally has several and unsimilar meanings for that particular word—and the result is a sentence that looks something like futurist poetry and that no reader can understand. And woe to the translator that dares to suppress the advertiser's slogan or catch slang. The manufacturer may not know the foreign lingo, but he is proud of his catchy slogan and knows that it ought to appear at a certain place, and no translator can cheat him and get away with it.



Mitchell cars being unboxed on the piers after unloading from the steamer at Rio de Janeiro, Brazil

Traveling Men Unsuited for Task

But the chief mistake of the novice exporter has been to send out a traveling man entirely unacquainted with the language and habits of the country he is visiting. His dilemma is either to limit his investigations and his prospects to English-speaking terms, or to try to do business through an interpreter. If the former, he will necessarily ignore those local concerns which are more identified with the local trade and more liable to get good results. If the latter, he is obliged to rely on the services of the hotel interpreter or another man of similar education to explain the construction and advantages of the car he sells, and the chances are that the interpreter never in his life knew what a camshaft or timing gear is. Through sheer ignorance—if not for being bribed by the agent of another make—that interpreter may say to the prospective buyer anything but what the salesman wishes to say.

The business man in a foreign country without knowing the language of that country is helpless and subject to whatever exactions may be made of him; he will never be able to get upon a social and intimate footing with his trade or his prospects. A good-willed salesman may have gone so far

In exporting Hupmobiles wheels and tops are attached to the sides of the packing cases before crating the cars

Assembling packing cases and nailing on the sides and tops in packing Hupmobiles for export trade

as to have taken a few Spanish lessons, for instance, before going to Latin America, but if he has not given up in despair and really thinks he is quite fitted for getting along by himself in a foreign-speaking country, he will know better as soon as he steps upon foreign soil. A language is a thing that cannot be bought "ready made" as a pair of shoes. It takes natural ability, time, persistence, and long practice to master it, and the average American is too busy and too impatient for that. The only possible course for the exporter desiring to send traveling men abroad is to select American men that have had years of experience covering those particular territories, or pick up a foreigner who has received his commercial education in the United States, preferably the latter.

Commission House Gets the Trade

That unwillingness and unpreparedness of the average American exporter to take proper care of the foreign trade has given an unduly prominent place to the commission house. Some American manufacturers that have years of satisfactory experience in exporting are already beginning to grant some credits abroad or to ship goods payable at destination, but the great majority of automobile exporters are still sticking to their strict rule of cash in advance or cash against documents at New York City. In order to realize the unwisdom of that rule it will be enough to consider the necessary time elapsed between the issue of the order by the foreign dealer and the receipt of the goods—even leaving aside exceptionally late deliveries which are a general cause of complaint against American manufacturers.

Delays and Expenses in Shipping

An order by letter from Australia or Argentine will take nearly one month before reaching the manufacturer. It can, of course, be sent by cable, but this procedure is quite expensive, especially when remittance is supposed to be sent with the order. Supposing now that the foreign order receives moderately prompt attention from the manufacturer, it will take nearly a month before the ordered goods reaches New York. Steamship service to foreign ports has been improving with the increase in exports, but even thus there are no steamers available every week—for many ports sailings are only monthly—and as space is generally scarce on those ships the goods have often to wait in New York for quite a few days or weeks before they are actually shipped.

The sea trip is, of course, more or less long, according to the distance and the speed of the ship, and some of the best automobile markets cannot be reached in less than four or five weeks. Adding to this the necessary formalities for passing the goods through the customs—and that clearance is often delayed for several days even when the shipper's documents are correct, which is not always the case—and, in many cases, that the goods have to be reshipped from port to destination, which may be an inland city. If we consider those successive steps, we will find that from three to six months frequently elapses from the day the buyer makes out his order to the day he receives his goods. During that time the foreign dealer is expected to have his money in the hands of the manufacturer, whether he sent it direct or he opened a credit with a New York banker.

American Cars Too Expensive Abroad

Those unfortunate circumstancese are accountable for the importance of the rôles played by the commission houses at present. They are a necessity—they fill the financial gap between the foreign buyer and the American manufacturer—but they are a necessary evil just the same. In recent times there has been a great deal of talk about their methods, but it is only natural that the troubles and risks which they take are not taken for hygienic reasons only, but that they expect to make a profit out of their transactions. Even when they do not get a commission from the manufacturer—and they at least try to—the buyer has to pay a commission of 5 per cent. in most cases, plus the interest of the money since the day the credit was opened at his city. Most often the New York concern has no office of its own in the foreign city, but only a correspondent who in turn feels that he is entitled to an extra profit for himself. The result is that, leaving aside transportation, duties and other legitimate charges, the price of the American car to the foreign dealer is from 10 to 30 per cent. higher than the price paid by the domestic dealer. He expects to make his own profit accordingly, and, at the end, the machine is sold to the ultimate purchaser at a price from 20 to 100 per cent. higher than the price in the United States—and this in keen competition with dealers of well-reputed European-made machines which have not required those heavy extra charges, and which can be sold on easy terms since agents are allowed easy terms by the European makers.

The tendency of the American manufacturer to shun all the necessary effort for building and keeping up an export trade has given birth to the frequent case of granting his agency for one or for several countries—even for the whole world—to a New York commission house direct, on its mere assertion that it is in a position to undertake the task of introducing that line of cars in its territory. More than one manufacturer has had sad experiences with contracts of that kind, but it generally takes quite a long time before he discovers his mistake and finds out that not only he has not obtained his share of the foreign business but that his cars have earned a poor reputation. If that contract was unwisely made for a long term of years he has shut off that foreign market, and his only resource is to try and cancel his contract with the commission house, often by means of consideration, which is larger than the profit he ever made through its co-operation. There are, no doubt, reliable, honest and recommendable commission houses in America, but they are in business for profit. They handle competitive lines and will naturally push the one that gives them the largest margin of benefit.

Keep Quality Up and Prices Down

In one word, the American foreign trade in automobiles has been a success and will continue to be so as long as the American manufacturers shall be able to keep the advantage gained at this present. As long as they can maintain their superiority in quality or price, the growth of the foreign trade is safe, but as the other automobile making countries are stepping close behind it would be quite wise to counteract in advance their competition by better distributing methods and by closer acquaintance with those foreign markets.

The Engineering Digest

Experiments with Brakes to Retard Action of Differential Gears and Avoid Skidding and Slewing

THE TESTS MADE WITH GERMAN MILITARY TRUCKS

DIFFERENTIAL gears are generally accepted as indispensable construction parts in automobiles, and little fault is found with them, perhaps mainly because nothing has been devised to take their place and remedy their shortcomings, excepting the differential locks which serve to suspend all compensating action of the gears completely in emergencies. Wilhelm Romeiser, an engineer of Berlin, now discusses these peculiarities of differential gears to which collisions and other accidents in the traffic in some cases may be due and which frequently interfere with traction where heavy loads have to be transported over slippery roads or streets. He recalls the numerous instances in which the power of the motor cannot be usefully applied because the differential permits all of the power to be wasted in spinning one of the driving-wheels around in the air or against the very small fractional resistance of slimy asphalt or wet clay, this being the condition against which differential locks were especially devised.

For the benefit of readers not fully familiar with differential action he illustrates the mechanism usually employed, as in Fig. 1, and explains how uneven resistance to the rotation of the two wheels, R_1 and R_2, tends to make the wheel with the smaller resistance run faster than the other. If one wheel is held immovable by the brake, for example, the other wheel would run twice as fast as under normal conditions, were it not that the resistance to the forward movement of the vehicle holds the wheel back. In fact, under the circumstances mentioned, the differential acts as a planetary multiplication-gear making the gear ratio of the transmission twice as high as normally, so that the result of braking one wheel may even be that of stopping the motor, the resistance to motion being doubled at the free wheel and more than doubled at the other. But if this does not take place at once, the tendency is in all cases to turn the vehicle around the locked wheel and therefore to swing the front wheels out of their tracks.

During the operation of a car, sharp one-sided braking can occur without any fault on the part of the driver (1) when the brake-equalizer fails, the brake rods are out of order or one of the brake bands or shoes fails to act, (2) when a wheel bearing seizes, as may occur from the breaking of a bearing ball or roller, (3) when a tire bursts at full speed and gets wedged between the wheel and the vehicle body, and (4) when one wheel suddenly gets into heavy sand where the resistance to its rotation is much increased.

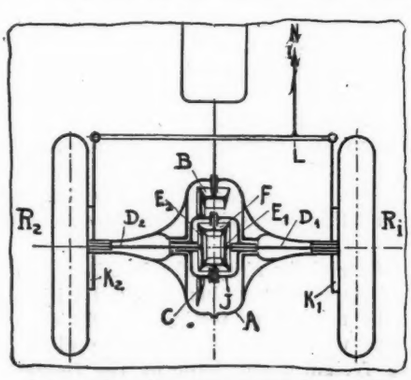


Fig. 1—Standard arrangement of differential in rear axle and of vehicle brake rods—top view

Under any of these conditions the action of the differential gear may cause slewing of the vehicle.

Loss of traction caused by the free spinning of one wheel is especially frequent and annoying at the starting of trucks with heavy loads which have been standing for some time on soft ground or in places where hollows have been formed under the driving-wheels, as at freight bays and other loading platforms. In the case of military vehicles, of which usually more than one are supposed to be started at the same time, any delay caused to one of them from this cause is considered as particularly aggravating.

The action of the differential at turns is not always clearly understood. Assume that an automobile is to describe a full circle. The distance which the inner wheels must cover at such a turn equals $2\pi R$, R being the radius, and the distance traveled by the outer wheels is $2\pi\ (R + s)$, s being the wheel gauge. The difference between the two distances is thus always $2\pi s$. With a normal wheel gauge of 1.4 meter this value amounts to 8.79 meters; practically 9 meters. Figured on the circumference of an ordinary automobile wheel with a diameter of 90 centimeters, this equals 3 revolutions more for the outer wheel than for the inner one, if the difference in the distances shall be equalized without skidding. And this difference, it is noticed, is independent of the diameter of the turn; but the smaller the diameter the larger this difference is in proportion to the whole distance covered in the turning movement.

Army Helps Experiments

With these considerations in mind, it was an obvious idea to try to reduce the harmful effect of the differential gear to such an extent as the necessity for correct steering would permit; in other words, to make the differential run hard by building into it a friction clutch and, more particularly, to adjust the friction to correspond to the torque of the motor working on high gear with direct drive; that is, to the torque acting at the highest speed of the vehicle when the danger of skidding or slewing, owing to one-sided brake action of any kind, is at its maximum. With a friction coupling so adjusted, acting together with the friction of the differential pinions to hold the wheel shafts together, the motor should not be able to turn the differential, and the effects of one-sided braking otherwise possible should be obviated. Acting upon these ideas the author obtained from the Royal Prussian Commission for Technical Traffic Tests a Dixi motor omnibus of 1911 model in which he was permitted to incorporate the automatically braked differential proposed by him and which he could also use for suitable running tests. To reduce the period during which this vehicle had to be taken out of commission for the reconstruction work, the Eisenach Motor Vehicle Works obligingly placed a duplicate rear axle at disposal for remodeling. The object was then to build into this axle, without any essential changes in the bevel pinions, a friction clutch so strong that the motor on direct drive could not turn the differential when the sharpest possible one-sided braking effort was applied. As the available space was narrowly limited, only a multiple disk clutch could be considered.

It was found that a space 74 millimeters in diameter and 70 millimeters long could be spared in the middle of the differential for the coupling, in the manner shown in Fig. 2 (in which the reference letters denote the same parts as in Fig. 1), and to make room for this coupling it was necessary to make new wheel shafts D_1 and D_2, new pinions E_1 and E_2 and a new cross for the pinions F. The coupling consists of the housing M which is provided with the guide ribs O on its interior wall and is secured upon shaft D_2 by means of the pins N. Wheelshaft D_1 is lengthened and its free end is turned down to enter rotatably in the bored-out end of D_2. The adjoining portion is formed with four splines, as shown in the cross-section of the coupling to the left in Fig. 2, which serve to hold 20 disks strung upon this portion of the shaft alternating with 20 disks secured in the housing M by the ribs O, in the well-

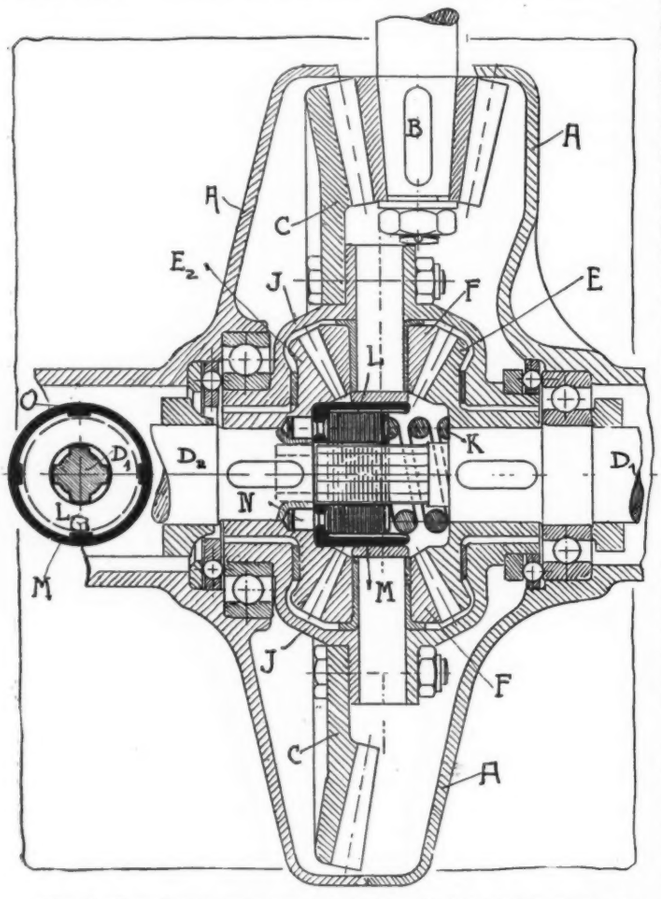


Fig. 2—Romeiser's experimental design of disk-clutch brake for the differential, horizontal section; cross-section of the new part to the left

known manner of disk clutches. The coil spring K produces the required pressure. By varying this pressure and the number of the disks the strength of the coupling can be changed within certain limits. Once adjusted to a certain torque resistance this style of coupling can thereafter be ignored; it takes care of itself in the operation of the vehicle.

Claims and Objections

[While the coupling has the advantage of creating a certain resistance which is independent of the vehicle load and the road resistance and which may be adjusted to equal the torque applied to the wheel shafts under those conditions when slewing of the vehicle is most likely to take place, it still seems to be a shortcoming that this adjustment must be made with reference to the full load of the vehicle and the full power of the motor, in order to cover this most important condition, and that the differential therefore must be practically locked when the vehicle is driven empty and the torque applied to the wheel shafts from the throttled motor is small. There is apparently room at this point for some careful calculations to show at what vehicle speeds the momentum of the vehicle, acting from the wheel rims backward to the differential gear and its brake, will be able to overcome the resistance of the latter, under normal road conditions and also when roads are slippery. The author does not furnish any technical argument on these points but relies, as shown in the following, upon the results attained in practice, which, however, can scarcely be exhaustive.—ED.]

During straight driving the coupling is not working, and the wheel shafts turn as a unit in their ball-bearings. At turns, if the friction of the coupling lies within the permissible limits, the relative movements of the two wheel shafts can take place. [It is in connection with this claim that the dependence upon the momentum and the road friction should be cleared up.—ED.] But, if one-sided braking effects occur during the driving, such effects are transmitted by virtue of the friction in the coupling to the wheel shaft on the opposite side, and the wheel on that side is also braked to that extent and not accelerated from the motor as formerly. Also at starting, if it happens that the wheels find friction with the road surface only on one side, the vehicle is not completely helpless but is capable of applying a push at the one wheel where friction exists. [But this push can evidently not be greater, with the adjustment of the friction in the coupling which is assumed, than that which could be applied by the motor working on high gear, which is not the gear usually employed for starting. A locking device would in this case serve better.—ED.]

The Practical Trials

The first test was made on December 15, 1913, before a committee of officers from the Traffic Test Commission, before mentioned, and the *Kraftfahr Bataillon* (a regiment of the Prussian army specially organized for trying out and improving the military motor vehicle service), as well as a representative of the prefect of police in Berlin, and took place during a pouring rain on the smooth asphalt of the new streets of Tempelhofer Feld in Berlin.

The brake rods of the hand brakes had been so changed that only one of the driving-wheels could be braked while the other ran perfectly free under all circumstances. At first the new coupling acted somewhat too sharply, evidently because it had not yet been run in; yet it could be shown that the vehicle, even so, could take every turn and curve and could do so without slipping or disengagement of the motor clutch. Careful tracing of the vehicle tracks demonstrated that the front wheels followed their natural curves with scarcely noticeable deviations. Throughout the range of speed when the one-sided hand brake was applied as sharply as possible, the direction of the omnibus was barely affected. The largest observed deviation from the direction of travel was 20 centimeters.

Comparative tests with an automobile equipped with the ordinary differential and one-sided brake should now have been made, but no one cared to assume the responsibility for what might happen, and this comparison therefore went by default.

In consequence of this trial the *Kraftfahr Bataillon* issued orders to have one of its freight trains provided with the differential brakes with a view to testing the device out more thoroughly at the winter maneuvers taking place in February. The Daag freight train, built by the *Deutsche Lastautomobilfabrik* at Ratingen, was selected for the installation. The motor truck of this train is a vehicle with

chain drive, and the differential brake therefore had to be built into the jackshaft. The main purpose in building the device into the Daag vehicle was not to prevent slewing but to obviate the spinning of one wheel. While slewing is a more dangerous occurrence and takes place mainly at high speed, spinning occurs mostly at startings when the torque applied to the drive shaft is at its maximum. It was therefore desirable to intensify the braking of the differential as much as possible. As only three weeks were at disposal, however, for the remodelling, it was not found practicable to get more room for the device than was used in the Dixi vehicle, and no other resource was open for obtaining the stronger brake effect than to increase the strength of the spring K. A spring with half-inch wire was chosen. The author was permitted to take part in the entire series of maneuvers with the *Kraftfahr Bataillon.* The upshot of this interesting experience was that the Daag vehicle, despite the strong braking of the differential, went through all the exercises without any troubles, taking every curve and gradient irreproachably, and was always at the head with the best of the other vehicles. No objectionable influence of the differential brake upon the steering facilities or the working capacity of the vehicle could be observed. The wagon trains had very definite military tasks set for them and were tied down to a strict order of march, and, though the roads were relatively good, it happened rather frequently that vehicles were delayed at starts by the spinning of a wheel; but the Daag vehicle always came off promptly and was able to keep the prescribed distance in the file of march. On the other hand, no opportunity could be given it for special performances.

Wear of the Device

After the end of the maneuvers the coupling was dismounted. Nothing was changed except the disks, which showed excessive wear. While the device had operated satisfactorily to the last, the specific pressure in it had been too high. In the case of the Dixi vehicle, which had done similar work, no wear of the disks could be noticed. It is thus shown to be necessary in the future to make the coupling of such dimensions that the specific pressure can be held within the proper limits, and if this is done the excessive wear will not occur.

It would be desirable to have it determined in a correct and scientific manner—as by the use of the testing installation at the Technical Highschool at Charlottenburg—to what extent braking of the differential is consistent with the steering facilities of an automobile and what favorable influence such braking has with regard to skidding.

It may even now, in view of the tests made, be considered as settled that a very considerable braking effect can be applied to the differential without affecting the steering or the efficiency of the vehicle, and it may perhaps be taken as self-evident that the tendency of the ordinary differential to cause slewing must be considerably reduced by adding the automatic braking device.—From *Automobil-Rundschau,* May 15.

[It probably does not escape the reader that, on the premises supplied by the author, the preference should perhaps be given to an automatic differential brake affording pressures sufficient only for the moderate driving-torques mostly employed at high speed supplemented by a hand-operated differential lock sufficiently positive to take care of emergencies arising at starting and at slow and heavy driving.—ED.]

Horn Inside of Motor Hood

BETTER tone and increased volume of sound are obtained from a bulb-horn, according to *Autocar* of May 30, by placing the horn under the bonnet facing the radiator and connecting it to the bulb by means of copper tubing, which may be easily bent to follow the angles of the car body. The copper tube is cheaper and more durable than flexible tube, and the invisible arrangement is believed to be in accordance with modern preferences.

Aluminum Radiators Without Water Now in Prospect

"WATER-COOLING is, as we know it today, admittedly better than air-cooling," writes Henry Sturmey in *Motor* of May 26; "but, when critically examined, the difference between the two is not a wide one, and if the gap can be narrowed, or entirely bridged over, the air-cooled motor and simplicity will come into their own. They must; for it is lighter and cheaper, and 'money talks.'" These remarks are preliminary to the information that a considerable step in advance for air-cooling has been made—for the present in connection with motorcycles—through an invention made by Harcourt Kitchin of Glasgow, consisting in attaching thin sheets of aluminum to the cooling-fins of a motor. As aluminum has a much greater capacity for conducting heat than iron it stands to reason that a considerable extension of the radiation area in this metal, with the assistance, when necessary, of an artificial air current playing upon this increased area, should go far to keep the temperature of the cylinders down. In the case of new motors, Kitchin proposes to make the cooling-fins entirely of aluminum and very large, and no difficulty is anticipated in applying the same principle to automobile motors of moderate size, the problem being simply the mechanical one of designing an aluminum radiator instead of one carrying water and placing it in greater proximity to the cylinders, in fact surrounding them. The tests which have already been made with the aluminum radiator fins in connection with motorcycles have shown that hills which previously could not be taken, because the motor became overheated, were taken without difficulty with the new arrangement; and a fuel saving was also demonstrated. According to Mr. Sturmey, "provided we have radiators which will take the heat away from the cylinder walls as quickly and efficiently as a constant flow of water will, there should be little difficulty in adapting them to motorcar needs." And at this point American experience might come to the rescue, as here the very considerable difficulties in cooling four cylinders equally by means of a flow of air from ventilating fans, or from ventilating fans and natural air currents combined, have compelled considerable study and experimentation which have not been entirely in vain. The large areas of the aluminum radiator might, however, further emphasize this trouble. It is also a peculiarity of dealing with an elastic fluid, like air, that an arrangement found suitable in connection with one type of motor and one style of hood, for example, is likely to prove faulty under conditions which are very similar, yet not absolutely identical. And this peculiarity gives rise to much fumbling and costly experimentation—not necessary with water cooling, to the same extent.

Making High-Speed Motors Flexible

AMONG improvements coming to the surface in an experimental way in connection with motors capable of high speed there is mentioned the tapering of valve cams for the purpose of producing a very low valve lift at low speeds and a very high lift at high speeds, thus making the valve action suitable for a wider range of speed and power. It is not stated in what manner the necessary longitudinal movement of the camshaft—or possibly of the valve-actuating mechanism—is produced. As motor speed is the determining factor, is seems that a centrifugal governor must be brought into play; probably in connection with a screw threaded organ for displacement, in order to have the position of the cam positive under all circumstances.

Two Pathfinder Sixes for 1915

Many Body Refinements —Streamline Roadster with Large Baggage Space — Folding Seats

Cantilever spring shackled directly under rear axle, and at forward end, with pivot at center, together with phantom view through brake drum

TWO sixes will comprise the Pathfinder line for the 1915 season and but little change of a mechanical nature will be found for the coming year. Body refinements are many and especially in the roadster model where a streamline design has been carried out to the last word. This roadster, which is illustrated herewith, is especially noticeable in its baggage carrying facilities. The folding seats under the rear deck and the small door through which baggage can be put into the rear compartment are neatly arranged and are a new departure for Pathfinder practice.

Westinghouse System Used

This year the Westinghouse starter will be used on both the little six and big six models. The big six will go under the name of the Leatherstocking model, while the little six will be known as Daniel Boone. The Leatherstocking will be made only as a seven-passenger car and the Daniel Boone in seven-passenger and roadster bodies as stock.

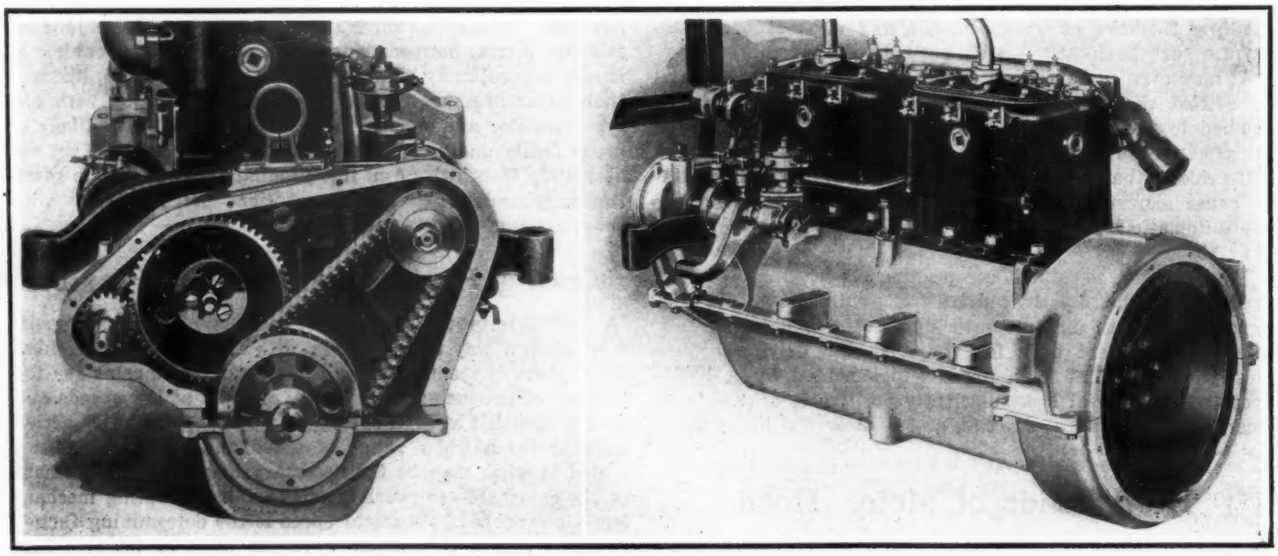
The little six, which is now ready for delivery, has the little six Continental motor giving an L-head power plant with inclosed valve mechanism and three-point suspension. The makers claim 48 horsepower at 1,500 revolutions per minute for this motor and, according to the S. A. E. formula, it figures to 34 horsepower. The weight of the engine, including the flywheel and regular equipment, is 600 pounds. The cylinders are cast in blocks of three and the motor size is 3.75 by 5.25. The Leatherstocking uses the larger, 4.125 by 5.25 motor. The design of the two models is similar.

The Daniel Boone little six has light-weight motor parts. The gasoline system is operated by gravity feed and the carbureter is a 1.25-inch Schebler. The ignition is by a dual system and starting and lighting are taken care of by a Westinghouse outfit. The motor is oiled by force feed, a constant level in the crankcase being maintained by a gear pump.

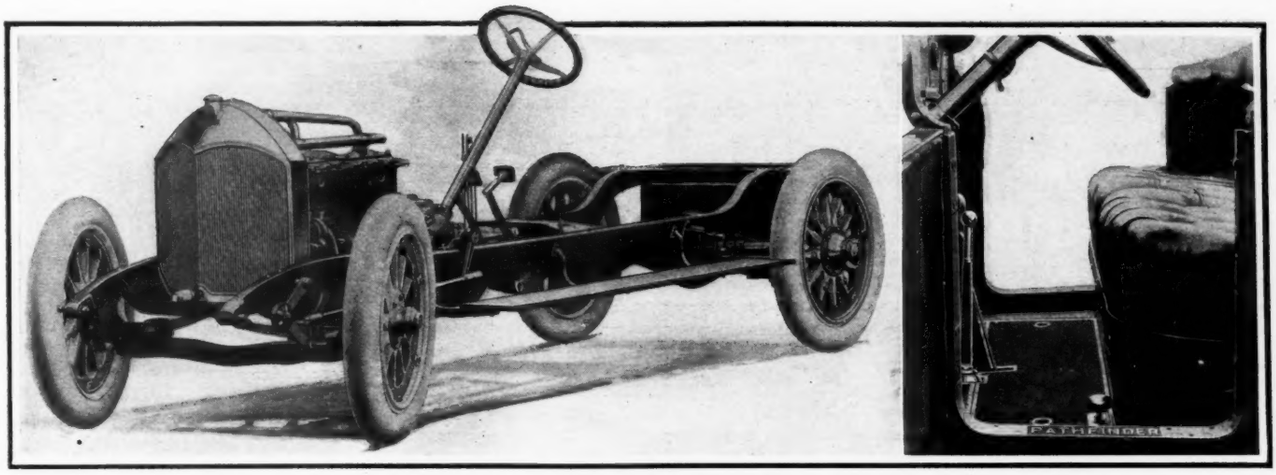
The inclosed valves are on the right side of the motor and operated by a camshaft having a diameter of 1 1/16 inch. The camshaft runs on three bearings, the front one, which takes the strain of the timing gear drive, having a bearing 2.25 by 2.625 inches, the center bearing 2 by 1.875 and the rear 1.125 by 2.125. The heads of the valve stems are hardened and the valve springs are oil tempered.

The piston pins are of chrome-nickel steel and have a bearing length of 1 7/32 by 1⅞ inches. Three piston rings are used on the pistons, each having a width of 3/16 inch. Connecting-rods are of I-beam construction, having .40 carbon steel drop forged and heat treated. The ends are bored and reamed and the caps are held in place by nickel steel bolts.

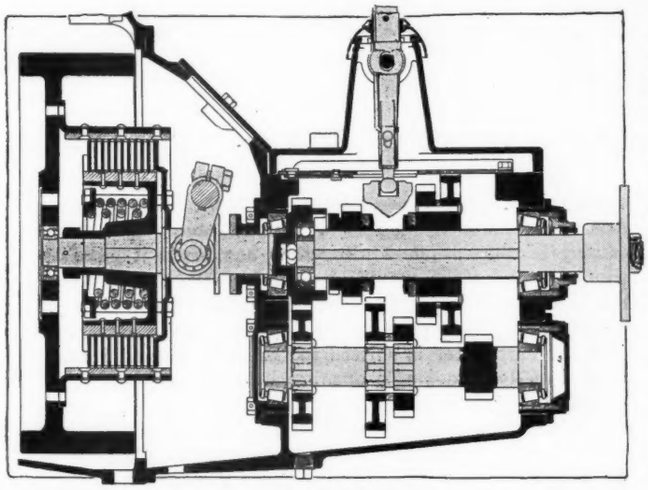
The crankshaft is also a .40 carbon steel drop forging and is heat treated, giving it a tensile strength of 90,000 pounds per square inch. The three main bearings and the six crank-



Left—Front view of timing gear drive by silent chain on Daniel Boone model Pathfinder for 1915. Note the mounting for fan and transverse member for supporting front end of motor. Right—Left side of six-cylinder motor used in 1915 Daniel Boone, showing location of pump



Left—Three-quarters front view of 1915 Pathfinder Six, showing V-radiator. Right—View through front seat of Pathfinder, showing easy entrance and exit facilities



Sectional view through four-speed gearbox used on 1915 six-cylinder Pathfinder

pins are all ground to size and when finished the crankpins have a diameter of 1.875 inches and the main bearings have a diameter of 2 inches at the ends and 2.25 inches for the middle bearings. Flanges are provided on the crankshaft to take up end thrust.

The timing gears on the light six Continental motor are housed in a gearcase on the front end of the motor and they are cut to a helical pitch. The set of gears comprises a crank, cam and magneto gear, the latter two driving their respective shafts. The bearings for these shafts are all of nickel babbitt and the same material has been used throughout for bearing construction. In the connecting-rods and crankshaft the bearings are held in their places by brass retaining screws which are locked in position. The bearings are reamed and scraped by hand.

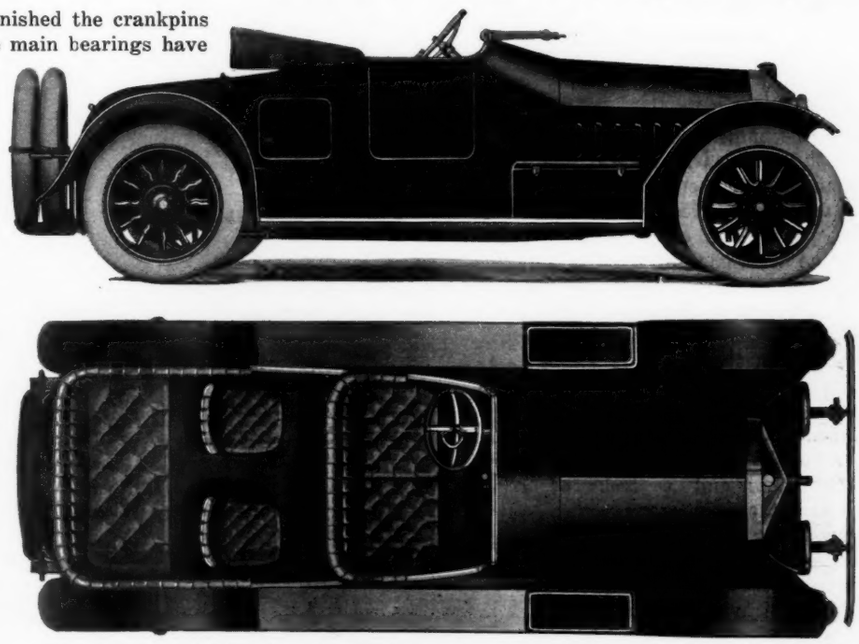
The shims used in the connecting-rod bearing for making adjustments consist of a series of punched sheet steel sheets which vary in thickness. This permits a repairman to remove a shim of any thickness he desires.

The intake and exhaust manifolds are carried on the valve side of the motor. They are cast separately and held to the cylinder castings by means of studs. The gasket material is asbestos. A point to be noted in the design of the exhaust manifold is that it is so arranged as to not interfere with a ready adjustment of the valves.

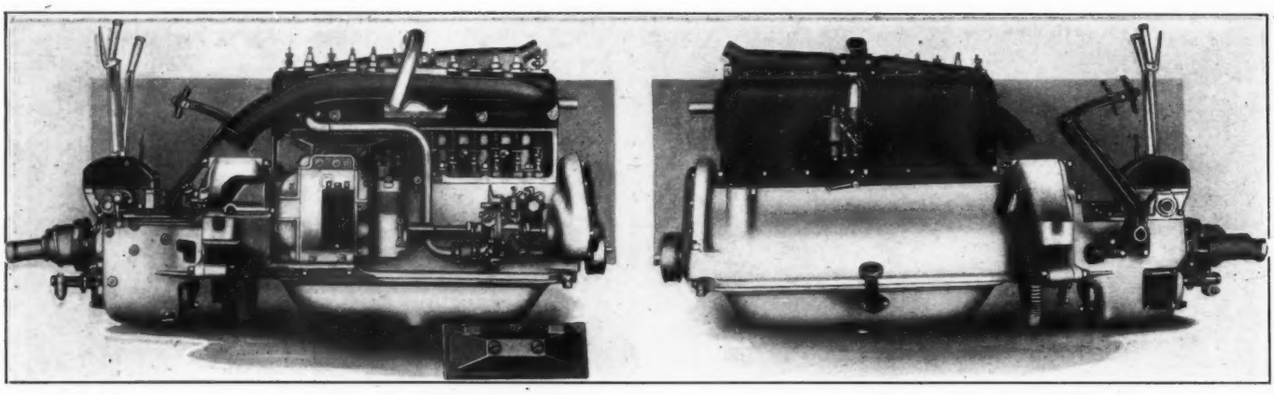
The clutch used on the little six Pathfinder car is a dry plate disk type having eleven disks. It is held in the flywheel and the latter is bolted to the crankshaft flange by six steel bolts. The rocker shaft operating the clutch is carried through the bell housing for the connection to the operating pedal.

The Brown-Lipe gearset has four-speeds, and the countershaft and gears are made of 3.5 per cent. nickel steel. The reductions on the gearset gears are respectively .787, 1, 1.61 and 3.29 to 1 for the four gears. The rear axle ratio is 3.77 to 1, making a total reduction between the motor and the rear wheels of 2.9 to 1 on indirect fourth, 3.77 to 1 on third, which is direct, 6 to 1 on second and 12.4 to 1 on first. The reverse gear ratio is the same as first speed, 12.4 to 1.

The price of the car has not been changed for this season.



Two views illustrating the six-cylinder 1915 model Pathfinder, the upper showing the torpedo type roadster, having a folding seat carrying two passengers in the rear, while the lower is a plan view of the seven-passenger touring car



Left—Valve side of block cast motor on Hudson Six-40 for 1915 with gearset in unit. Right—Left side of Hudson Six-40 motor showing carbureter mounting. This motor is the same size as last year, 3½ by 5 inches

Hudson Six Now Has Block Motor

Increased Production Makes $200 Reduction Possible—Many Minor Improvements and Refinements—Automatic Spark Advance

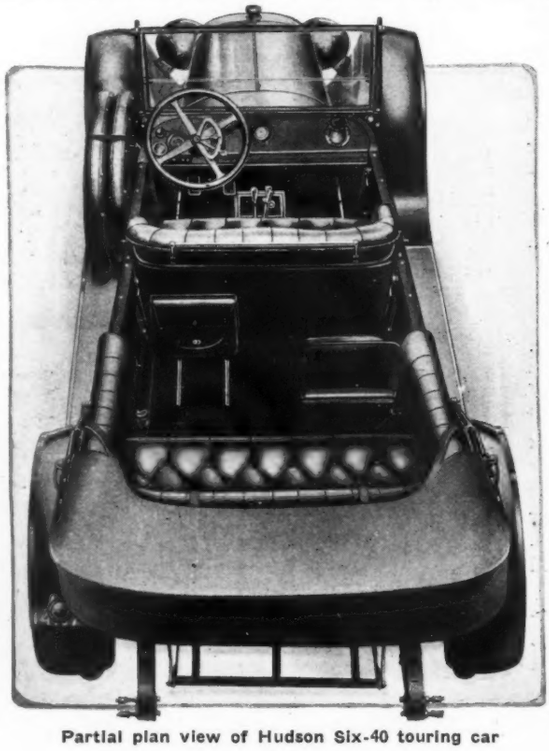
THE Hudson light six-cylinder car is now in its second year, and for 1915 it presents little mechanical change or alteration in outward appearance. However, the announcement of the 1915 model of this Six-40 Hudson carries with it one very important feature, and that is a material reduction in price of the car. Two hundred dollars have been clipped from the figure, making the touring car and roadster procurable for $1,550, the convertible roadster for $1,750, the coupé for $2,150 and the limousine for $2,550. The factory points out that this reduction is made possible by an increased production over that of the 1914 season, the new Six-40 being even more refined in all its parts than the preceding model.

Bodies Are Comfortable

Besides the price, the most important changes have been in the motor and chassis, although even these are minor alterations and do not affect in any way the general mechanical layout over that of the 1914 car. Several slight changes have been made in bodies to afford even greater comfort for the passengers.

The wheelbase of the car still remains at 123 inches, and the total weight is about the same as it was—2,980 pounds. If anything, however, this is slightly less than it formerly was, due to some detail changes which will be taken up later.

Though still having a bore of 3½ inches and a stroke of 5 inches, the new car's engine is now a single block casting for the six cylinders, instead of having them in threes, as formerly. No difference in the general over-all length of the power plant and gearset, which is in unit with it, is made by this change.



Partial plan view of Hudson Six-40 touring car

The L-head construction with the valves all on the right side and inclosed by two cover plates is adhered to, but the casting of the cylinders altogether has made it possible to eliminate an intake manifold entirely. On the 1914 motor the carbureter was placed on the right side with a two-branch manifold leading to the cylinder blocks. On the 1915 type the carbureter is shifted to the left side and its flange bolts directly to a single opening in the casting midway of its length. Thus the gas passages to the individual cylinders are cast in the cylinder block and lead across through the jacket spaces to their respective valve ports. Consequently, the gas passages to the cylinders are entirely surrounded by hot water, the additional heat obtained in this way aiding in the vaporization of the fuel.

Zenith Carbureter Is Used

Another point for the aiding of the carburetion is the manner of getting air to the carbureter. The air intake connects through a tube with an opening cast in the top of the cylinder block. This runs across to the right side, where its far end is open. Due to the close proximity of this opening to the hottest part of the exhaust manifold the passage gets the hottest air and conveys it across through the upper part of the water jacket to the carbureter intake. This may readily be seen in the view of the left side of the engine. The Zenith carbureter is still used.

Finer Motor Balance

Due to finer balance of the reciprocating parts, to a stronger crankshaft which, though still supported on three large bearings, is ⅛ inch larger in diameter, and

to the resulting fact that the engine is smoother in action, an increase in power is claimed for it. The output is from 40 to 47 horsepower under ordinary conditions. Connecting-rod bearings have also come in for some of the enlargement, being now 2 inches in diameter as against 1⅞ inches heretofore.

All Reciprocating Parts Light

All reciprocating parts have been designed as light as possible to be consistent with the work they have to do, and this is, of course, another enemy to vibration. Due to an alteration in the design of the helically cut timing gears, they also have been rendered much quieter and have greater efficiency.

No departures from the conventional are in evidence in the working parts. The valves are of nickel steel and interchangeable. The pistons are of gray iron, annealed, ground and lapped into their respective cylinders; wrist-pins are of nickel-steel tubing, hardened and ground, and are press fitted in place and held by set screws; connecting-rods are made of a special steel of the usual I-beam section; the crankshaft is forged and heat treated, and its throws are shaped so as to balance; the camshaft is forged with its cams integral and is hardened and ground. The latter shaft runs on three nickel babbit bearings.

Some of the motor dimensions are given:

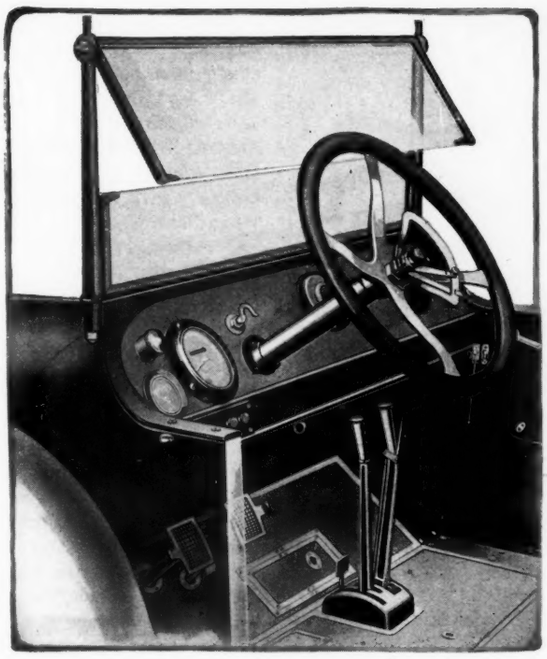
Crankshaft bearings:
Front—2 3-16 by 2 7-8 inches.
Center—2 7-32 by 2 1-2 inches.
Rear—2 1-4 by 3 inches.
Connecting rod lower bearings: 2 by 2 3-16 inches

Camshaft bearings:
Front—2 19-32 by 1 1-2 inches.
Center—2 37-64 by 1 1-8 inches.
Rear—1 1-2 by 1 3-4 inches.

Valves:
Diameter—1 11-16 inches.
Clear Opening—1 1-2 inches.
Lift—Inlet 9-32 inch; exhaust 11-32 inch.

Note—Referring to the bearing dimensions, the first in each case applies to the diameter.

As heretofore, the lower half of the crankcase is made of pressed steel, although the upper part is of aluminum and carries the three crankshaft bearings independently of the lower part. From the sides of the crankcase, pressed steel aprons run to the side frame members, preventing mud and dirt from getting above the frame and onto the engine apparatus. This construction eliminates a mud pan under the power plant and has the special advantage that the oil reservoir in the lower part of the crankcase is exposed, insuring better cooling of the oil which is an aid to efficient lubrication. This feature, however, as well as the constant level splash system of oiling were used on the 1914 car.

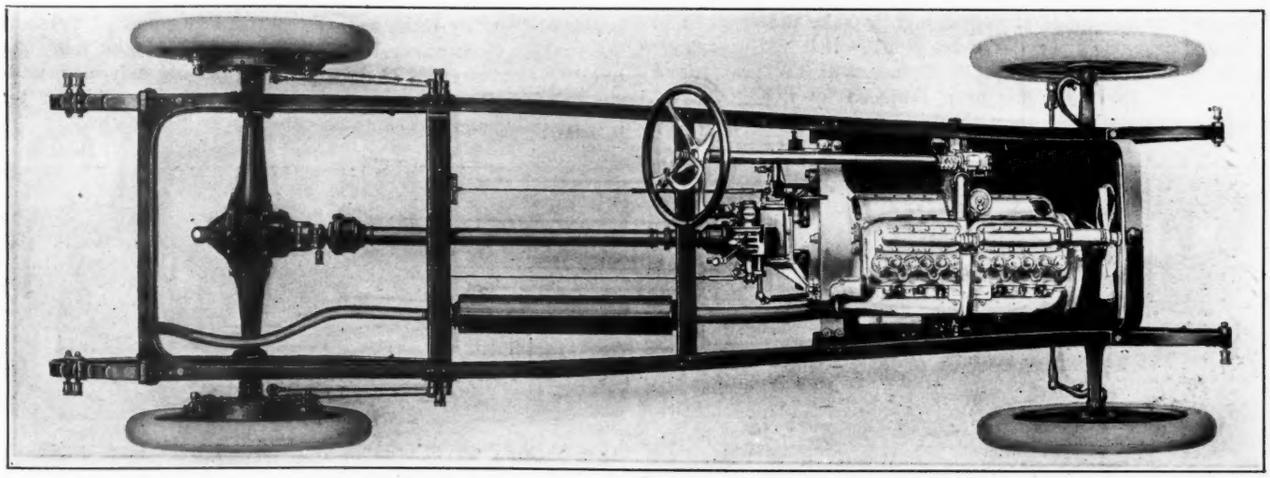


Hudson Six-40 showing cowl arrangement, new type of windshield and control features

In the cooling system one change has been made. An improved type of honeycomb radiator of large cooling capacity replaces a less efficient one of the same type. Water is circulated by a centrifugal pump of ample size driven by a shaft on the right side of the motor.

All electrical functions continue to be provided for by a combination Delco cranking, lighting and ignition system. The motor generator unit with which the ignition distributer is an integral part is carried on a crankcase bracket on the right side of the engine and close to the flywheel. As a generator, the device is driven in the usual way by an extension of the pump shaft. When operating as a cranking motor, it drives through a set of gears housed within the right arm of the crankcase. The flywheel rim is provided with teeth for the purpose. When operating as a generator, the ratio of engine speed to generator speed is 1 to 1.25, and as a cranking motor, the electrical unit runs about twenty-three times as fast, due to the two reductions in the gear train. To mesh the gears for starting, a small pedal close to the center control levers is pushed. This slides all gears into mesh. At other times, none of these are meshed, hence noise is eliminated.

The Delco system now fitted is somewhat simplified over last year. A circuit breaking relay for detecting short circuits in the wiring is now provided instead of the fuse box. All wiring is greatly simplified. The wires run in rust-



Top view of the chassis of the Six-40 Hudson for 1915 showing the tapered frame continued from last year. The members are parallel for 50 inches before the taper begins and the width is 39 inches at the rear and 30 inches at the front

Upper—Hudson six-40 convertible roadster. Lower—Regular roadster type with top down

proof, flexible metal conduits closed at the ends and anchored against chafing and rattle.

In the ignition part, a noticeable refinement is the addition of automatic spark advance in combination with the regular spark advance by lever on the steering wheel quadrant. This automatic advance might be said to "work above" the hand advance. That is, supposing the lever to be set for any position of advance, the automatic then adjusts the sparking accurately to fire within certain range of the set position. This should add to the motor efficiency.

A positive lock has been provided on the ignition and lighting switch which makes it impossible to lock the switch before the engine has been stopped. Any combination of lights may also be locked in position. The car carries the same storage battery as before—a 100 ampere-hour Exide.

The multiple disk clutch contained in an oiltight case in the flywheel has not been altered, and the gearset which is in unit with the engine is also the same as it was. There are three forward speeds and all shafts run on roller bearings. Practically the same method of mounting the control levers on top of the gearbox is adhered to and provision for getting at the gears is provided.

Drive Is Through Rear Springs

Hotchkiss drive through the rear springs is still used, and is perhaps the simplest construction possible. Instead of torsion tube or torsion arm, the master leaves of the two rear springs are made strong enough to take the torque and drive. Last year's peculiar drive shaft which had a varying cross section, being largest in diameter at the center and tapering to the ends, has been replaced by a hollow steel shaft, which is lighter than the solid type though equally as strong. Besides eliminating considerable weight on the axle bearings and the transmission rear bearings, this hollow shaft is a better manufacturing proposition. The tapered shaft was difficult to make. In the new construction the ends which attach to the front and rear Spicer universals are welded to the tube, the front being the splined part and the rear being the forked portion of the rear joint. This hollow shaft also eliminates any tendency to whipping or vibration.

No change in the springing is found. The rear three quarter elliptics still measure 54 by 2 inches and are underslung from the axle. The result of this is a lower suspension of the chassis without altering the road clearance. As before, the rear springs are attached to the frame directly under the side rails. This gives no arm which might twist the side members. Attachment is by clip and bolt, the former looping the outer end of the cross member and the latter being forward of it. This gives a very rigid mounting. The front springs are above the axle and measure 39 by 2 inches.

The rear axle has not been changed. It is reinforced pressed steel, the driving gears and differential being mounted as a unit and removable as such. Pinion shaft and differential case are mounted on taper roller bearings, and nickel steel is used in shafts, gears and pinion. Fourteen by 2 inch standard brakes are used.

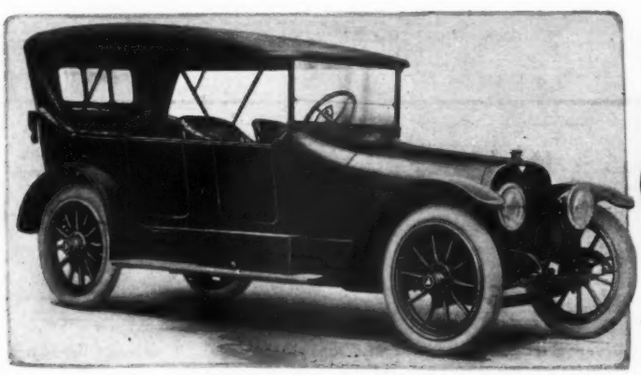
The tapered frame which was a feature last year is still used. This has its side members parallel for a distance of 50 inches forward from the rear, when they commence to taper inward toward the front. There is a difference of 9 inches between front and rear width, the rear being 39 inches across.

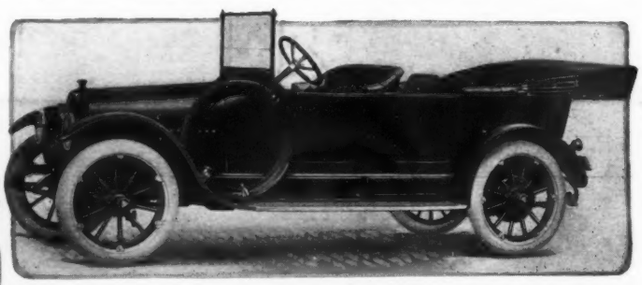
Speedometer Is Run by Main Shaft

Several chassis refinements are of special note. The speedometer drive has been removed from the front wheel spindle, and is now run off the main shaft just where it emerges from the gearbox and ahead of the forward universal joint. Thus the drive is very stable and should prove a very advantageous location. It is away from road dirt and is not subjected to any vertical movement as with the old method.

Another improvement is the use of self-lubricating bushings in the steering column tube, the front axle cross tie rod, the yokes and the rear axle brake shafts. These bushings are said to be much superior to the type heretofore used and as it is not necessary to lubricate them, little trouble should be experienced from squeaks or rattles and from wear at these points. The average driver seldom, if ever, lubricates these parts which often results in rusting as well as noise.

The gasoline tank, which is carried under the cowl has been considerably lightened, the fitting being now of pressed steel which is stronger and weighs less. The tank has two partitions, to prevent the fuel from splashing sideways, and there are sediment cups and shut-off cocks in addition to a gasoline gauge. The tank capacity is 13 gallons.





Left—Hudson Six-40 phaeton with divided front seat. Right—Touring car. Note mounting of spare tire at the left front end of running board, far enough forward to allow easy entrance and exit for front seat

Six Light Dimmers Tested by Safety First Society

NEW YORK CITY, June 5—The first demonstration of non-glare devices for automobile headlights was made in this city tonight by the Technical Committee of the Safety First Society, for the purpose of demonstrating to several state and city officials the progress that has been made in this direction. Half a dozen different non-glare devices were fitted to cars and these driven along unlighted roads in Van Cortlandt Park in the northern part of the city. The roads selected were winding and rolling so as to bring into play every factor needed in eliminating the glare from the headlights.

While no awards were made, and no reports issued, the work being simply a demonstration for the officials, it was the general opinion that much progress is yet to be made in many of these non-glare devices, and that while the majority of them effectively eliminate the dazzling or glaring rays of light, yet several of them cut down the effective illumination to such an extent as to severely impair the usefulness of the headlight and make it more or less dangerous for night driving on the country roads with their black oil surfaces.

Must Not Reduce Illumination

Mitchell May, Secretary of State, New York, one of the chief spectators at the test, was of the opinion that any device which reduces the illuminating quality of the lamp will not be the eventual solution of the dazzling problem. It is not difficult to eliminate the dazzling rays, but it is a problem to eliminate these and yet conserve the illumination.

Borough President Marcus M. Marks of the Borough of Manhattan, who observed the demonstration, is at present having a study made on the question of over-illumination and believes that with a lesser quantity of light, the driver of the motor car will have a better vision of the road than with over-illumination. He bases his conclusion on the physiological fact that too brilliant a light deadens the retina of the eye and so makes it impossible to absorb as great a quantity of light as when the illumination is less violent and the retina is able to absorb a greater quantity of light. Reasoning from these facts, President Marks assumes that within the next few years important legislation may result because of the effect on the eye of over-illumination.

Among the different devices in the demonstration were:

1. *Ward-Leonard*—Two semi-transparent shutters are mounted within the lamp, slightly in advance of the bulb. These shutters are hinged on vertical axis and operated electro-magnetically by push-button. For ordinary use the shutters stand fore and aft not interfering with the light and for dimming they stand crosswise in front of the bulb.

2. *H. W. Johns-Manville*—A special curved annealed glass is used in the lamp in place of the regular glass. The inside of this glass is frosted with the exception of an oblong space in the middle of the glass and extending to within 2 inches of the bottom of the rim. Through this opening the light passes without restriction onto the road surface.

3. *Corning Glass Works*—This is a colored glass in the lamp in place of the regular glass. Due to the composition of the glass the violet and blue rays are cut out, as these are the rays which are supposed to cause the glaring.

4. *Matisso*—This is a hemispherical shutter which works about the bulb. For dimming purposes the shutter is located in rear of the bulb, in which position it cuts out the effectiveness of the lamp reflector. For non-dimming use the hemisphere is directly in front of the bulb.

5. *Legalight*—This device is a small hemispherical holder in which the bulb is located. In addition to cutting out the use of the reflector it also can be tilted to direct the rays of the light downward.

6. *Dim-o-lec*—No description.

Accessory Organization Gives Real Aid

SINCE the inception of the Motor and Accessory Manufacturers Assn., 10 years ago, the Board of Directors have aimed to run the organization on a business basis and along conservative and productive lines, without noise or display. Because of this fact, many people probably do not know that the membership of the Association now numbers 262 firms and corporations of the highest standing, and perhaps few people realize that the combined capital of the said interests represented in the membership is somewhat over $440,000,000.

Its primary objects are to promote in all lawful ways, the interests of makers of automobile motors, motor parts, or accessories; to aid in the protection of its members; to secure the advantages to be obtained by mutual co-operation; to facilitate the collection of the claims of its members and the diffusion of information concerning the trade, dealers, credits, and other matters of interest to the members of the association. The membership is limited to individuals, firms or corporations exclusively manufacturers and as such engaged in the manufacture of motors, motor parts, appliances or accessories used on or in connection with motor vehicles, or who may make so large a portion of the product disposed of by them as to be in the discretion of the Board of Directors considered eligible for membership.

J. H. Foster, President
Motor and Accessories Mfrs. Assn.

For example, take a typical concrete case of a condition which is arising frequently. An inventor or an engineer has a certain patented device which he is anxious to see manufactured and marketed. The device or design has certain obvious merits. He interests capital in his proposition and the capitalists are willing to concede that the article is one of merit and stands good chances of being marketed profitably. In getting down to cases, however, when considering forming a company, the capitalist often says to the owner of the patent: "You have a good thing and we are interested in backing your proposition, but I and my associates are not automobile men. We do not know the ins and outs of the motor accessory industry. You are an engineer and an inventor and not a business executive. You say that you will secure the services of a competent sales manager and business staff, but the matter of gathering together a good organization is a gamble. How do we know that your prospective organization is going to be competent to cope with new conditions arising, meet competition and emergencies, patent litigation, etc.?" And the reply is: "As soon as we organize and commence manufacturing, we shall apply for membership in the Motor and Accessory Manufacturers, which is an organization that will materially aid us in introducing our product in a profitable and practical manner."

For instance, there is the credit department, which furnishes ratings on all automobile manufacturers, corporations and individuals connected with the automobile industry, and collects and disseminates other useful financial information to members. Then there is a traffic department, with information and advice on all matters pertaining to the receiving and shipping of goods and proper routes. Also there is a legislative department, which collects, for reference purposes, copies of all State and Federal legislation when introduced, affecting either directly, or indirectly, members' interests, and is otherwise active in automobile legislation of all kinds.

However, The Motor and Accessory Manufacturers is not of benefit only to new members, nor is the period of its usefulness confined to those months when a new member is getting his business started. The departments operated and results otherwise accomplished are strikingly beneficial to long time members as well. In fact, of thirty-nine charter members, there are still twenty-nine identified with the Association. The Motor and Accesory Manufactuerers solicits additional members not because it requires them to swell the treasury, but because "In Union There Is Strength." It offers to each new member the firm knowledge that it receives 262 times as much as its one contribution in collective benefits.

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Dr. Steinmetz's Picture

ONE MILLION electric passenger vehicles and perhaps as many electric commercial vehicles in 10 years or perhaps less time is the pleasant picture painted by Dr. C. P. Steinmetz at the recent convention of the national electric light makers of America assembled at their annual convention last week, which convention, by the way, was the best attended in the history of the association, covering a span of nearly 40 years.

Dr. Steinmetz, while not closely connected with the automobile industry, but rather one who takes a broad perspective of it from a distant hill, has painted a picture which is possible providing the central station interests of America are united in going ahead with such a stupendous program. These central station interests, although operating in thousands of towns and cities in America, really form a very much unified organization, because with the exception of three or four of our largest cities, the central stations in the hundreds of our smaller cities are in the control of half a dozen organizations, each of which literally controls strings of central electric power stations. Owing to this centralization of control, there could be quickly assembled a stupendous power for the production and introduction of the electric passenger and commercial vehicle, providing these centralized interests were united and further provided that they were one in a determination to push forward such a gigantic plan.

Dr. Steinmetz's picture is a highly analytic one, chiefly that part where in philosophic trend the attitude of man towards personal transportation is depicted, but we must take issue with this learned electrician when he points to the elimination of the motor car for road work and state and interstate touring. Within a few years he thinks this will largely cease, that the automobile will become merely a utilitarian vehicle. Man has made constant use of the highways since the earliest days of civilization, and with every improvement in transportation there has been a corresponding widening of the zone of travel, so that the laws of the ages will be suddenly and inexplicably set aside if we find that within the next decade the desire to go abroad on our new oiled highways lessening and perhaps ceasing. It will be highly unnatural to expect such a condition of affairs, and, while 10 years may witness many changes in the mode of use of the automobile, it is a safe prediction that time will witness still greater progress in the use of the car as a long-distance vehicle of travel.

The Non-Glare Headlight

THE campaign for non-dazzling headlights which is attaining country-wide prominence and augurs for regulative legislation in many states is along the desired trend of safety first, but those who are pushing the movement must be careful not to sacrifice the safety that comes from adequate illumination for that not-yet-reached safety which follows in the wake of anti-glare devices of some kinds.

The problem of the non-glare headlight is twofold. First, we must eliminate the dazzling rays, and, second, we must conserve the original illuminating qualities of the lamp.

We need adequate light on our highways more today than ever before. With our black oiled roads it is much more difficult to distinguish pedestrians on the highway at night than it was years ago with our white macadam roadways.

Second: With our oiled highways there are more pedestrians on them at night than in the days of the dusty macadam roadway and consequently more need for real satisfactory illuminating headlights.

Third: Our cars are becoming quieter each year and this factor, taken into consideration with black oiled roadways and heavier pedestrian traffic, makes a genuine reason why we must not sacrifice the illumination of the headlight.

At present there are a score of different non-glare devices on the market, some purely mechanical and operated manually, others mechanical but operated electrically, and others that are mechanical devices without control, and still others that possess claimed non-glare qualities in the composition of the lens of the lamp. As to which will be the eventual types it is impossible to even suggest, and at this time it is difficult to foresee the exact direction from which the final solution will emerge.

The best non-glare will be one that will not have control of any nature, but will possess inherent qualities of eliminating the blinding dazzling rays and yet conserve the illuminating rays.

N. Y. S. A. E. Argues on Ideal Car

High-Speed Light Motors Favorites—Body Ideas Vary

NEW YORK CITY, June 6.—At a meeting of the Metropolitan Section of the S. A. E., held at the Automobile Club of America last night, a round table discussion took place on the ideal car. This subject, which is to be discussed at the summer meeting of the parent body at Cape May, will prove a fruitful source of debate if the meeting of the section is a sample of what is to come. The members present were all invited to give their ideals and then a detailed discussion was taken up, in which the car was gone over part by part.

William M. Power, who was first called upon to give some of the specifications of what would be his ideal were his means unlimited and if he were untrammeled by the requirements of the salesroom. Mr. Power specified a six-cylinder motor of small bore and long stroke with the weight kept to the lowest possible limit, and said that he would not put either electric lighting or starting on the car. He also wanted right drive. In mentioning the clutch he believed that the single plate would be the best design.

Henry G. McComb, Gasoline Division, General Vehicle Co., specified a 3 by 5-inch six-cylinder car in which the flywheel was made of heavy weight. His clutch specifications agreed somewhat with Mr. Powers', except that, in addition to asking for the single-plate, dry-disk type, he thought that cork inserts should be used. As for the springing, this should be given particular attention, and it was his belief that the three-quarter elliptic rear would prove the best design. Mr. McComb liked a car to be light, but at the same time believed that a long wheelbase should be used. One of the specifications he mentioned was wire wheels, but as far as the starting system was concerned he thought that that should be installed because one of the requirements of an ideal car is comfort, and since removing the starter would put more work on the driver, it should be left on the car.

Believes in Plenty of Gearshifting

Arthur Buzby wants a four-cylinder motor in his ideal car, with plenty of gearshifting. He believes that it is fallacious to design a car that will be capable of going as high as 50 miles an hour on high gear and at the same time be capable of being throttled to 4 or 5 miles an hour without shifting. The engine, in his belief, should be operated at a higher mean effective pressure than is now common practice.

P. P. Dean, Chevrolet Motor Co., in specifying his ideal car, said it would be a light touring model with a four-cylinder engine. He favored the overhead valve because of the greater hill-climbing ability of the car for a given piston displacement. He stated that a motor with a rating of about 30 horsepower on the S. A. E. formula would be about the right size for a fairly heavy car, or for example a 3.75 by 4-inch on a 2,000-pound car. As for a clutch, he said he would fit anything but a cone design. As a measurement of the ability of the car he mentioned an example of the hill that the car should be able to climb on high gear, the Abbey, a well-known demonstration hill in this city, having a mean slope of 8 per cent. He thought that the car should be able to take this hill at 20 miles per hour.

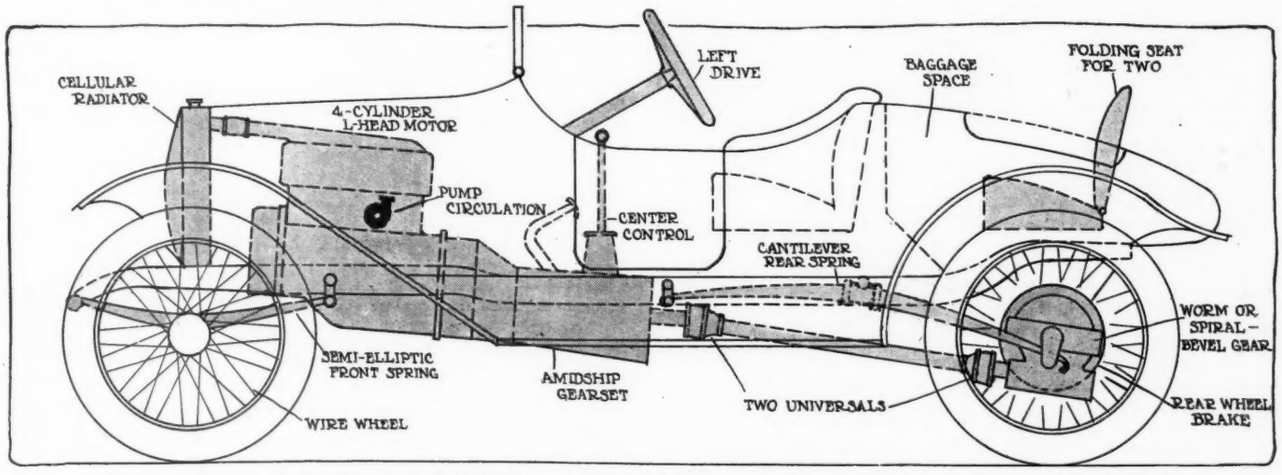
A. M. Wolf, Twombly Motors Corp., in bringing forward his ideas on the ideal car, showed himself to be another devotee of the four-cylinder. He believes in a 3.5 by 5-inch design, and in connection with this would use a three-plate dry clutch. The gearbox, he stated, should be mounted at the front end of the torque tube. F. C. Wolf wants an electric starter on his car. He desires a four-cylinder L-head design with a four-passenger body. In his opinion the power plant should be constructed as a unit and the drive should be on the left with center control. Mr. Wolf specified wire wheels.

There were several members present who were more or less agreed on the high-speed, small-bore, long-stroke motor, with a power curve that did not start to fall off until around 3,000 revolutions per minute. This motor should be used in connection with a four-speed gearbox, although many differed as to whether the fourth speed should be above direct or not. The rear axle desired was either a worm drive or as a compromise between the worm and the bevel gear, the spiral bevel. Cantilever rear springs were regarded as a desirable feature for this car, and wire wheels, if the car could be readily kept clean. The pressed-steel wheel found several supporters.

Many Ideas on Body Design

As to body design, many differences of opinion were found among the members who varied widely in their points of view. Messrs. Herbert Chase, N. B. Pope and J. E. Schipper had similar views on the body situation, their ideas incorporating a streamline type of roadster with a rear deck into which folded a seat with a carrying capacity of two passengers. This seat is invisible when not in use, and the cover does not interrupt the streamline deck. The compartment into which the seats fold forms a baggage-carrying space with considerable capacity. Only one incorporated in his ideal any but a poppet valve motor, and this was Herbert Chase, who liked the rotary valve type.

After the presentation of their ideals the members proceeded to debate the pros and cons of each method of construction and design. The most interesting part of the argument hinged around the question as to whether the four or six would be better for all around use. Those who had driven sixes stated that until that time they had never known what it was to feel as if the car had no motor. The smooth acceleration and the absence of vibration was strongly



S. A. E. ideal car has folding rear seat for two, unit power plant, worm drive, cantilever springs and wire wheels

argued. On the other hand, there were others who had had experience with both types and who stated that it was their belief if anyone were put blindfolded into the tonneau of a good car they could not tell whether they were riding in a four or a six.

Cone Clutch Finds Supporters

The clutch proved to be another mooted point, and while the cone clutch was at first criticized by many, its supporters rallied and proved to be more numerous than its opponents. Louis P. Prossen, of the Mason-Seamon Transportation Co., which handles hundreds of taxicabs in this city, stood up valiantly for the cone clutch. He stated that it requires little attention, is smooth and has long life. Two members present, one who had driven his car for 8 years and another for 11, each stated that with the cone clutch they had not been bothered with any clutch trouble. After the cone clutch in popularity would be dry plate, according to those who took part in the debate, some favoring the single plate and others the multiple.

There were many devotees of the cantilever rear spring present and others who favored the three-quarter conventional elliptic. In specifying their springs the members believed that, although the spring maker was under difficulties, on the ideal car the springs should be designed to meet the weight of the passengers. At the present time as stock models are turned out, the springs are designed to meet the maximum weight requirements, and as a result they are too heavy for the normal load, giving a stiff-riding car.

S. A. E. May Break Its Attendance Records

NEW YORK CITY, June 8.—Fully one-third of the members of the Society of Automobile Engineers will attend the coming summer meeting to be held at Cape May, N. J., June 23-26. As many guests and the families of many of the members also attend the meetings, it is estimated that the attendance may surpass that of the last summer meeting. Many of the members have made reservations at the Hotel Cape May, without communicating this fact to the Society headquarters, and for this reason it is impossible as yet to state the exact number who have signified their intentions of attending.

While the meeting will extend over 4 days, the meeting of the Standards Committee will occupy the first day, and three days only will be left to conduct the business of the entire society. The business session will open on June 24, at 2 p. m., when H. M. Leland will deliver the presidential address. This will be followed by the treasurer's report, given by the treasurer, Herman F. Cuntz. The papers and committee reports will be given in the following order:

Wednesday, June 24, 2 P. M.

1. Business session.
2. Professional session.

Report of Research Division—David L. Gallup, chairman.

Report of Iron and Steel Division, Henry Souther, chairman.

Report of Miscellaneous Division—John G. Utz, chairman.

Thursday, June 25, 9 A. M.

Report of Pleasure Car Wheels Division—Henry Souther, chairman.

Tolerance Specified in Connection with the British Standards of Rims for Pneumatic Tires—E. R. Hall, experimental engineer, Goodyear Rubber & Tire Co.

Possibility and Difficulties of Formulating Acceptable Recommendations for One Standard Felloe Band for Wheels to be Equipped with Pneumatic Tires—C. C. Carlton, Firestone Rubber and Tire Company.

A General Summary of the Truck Tire Situation—J. E. Hale, experimental engineer, Goodyear Rubber & Tire Co.

Report of Springs Division—Harold L. Pope, chairman.

Ignition and Starting Devices—A. D. Libbey, engineer, Splitdorf Electrical Company.

Electric Transmission for Motor Cars—J. B. Entz, the White Company.

Thursday, 2 P. M.

The Ideal Car. Introduction of Discussion—C. E. Davis, advertising mechanical engineer, Engineers' Club.

Possible Weight Reduction of Cars—A. P. Brush, consulting engineer, Brush Engineering Association.

Necessary Elements of Design for a Successful High-speed Motor—D. McCall White, Cadillac Motor Car Company.

Motor Capacity for Motor Vehicles—C. T. Myers, mechanical engineer, 202 Sherer Building, Detroit.

Report of Electrical Equipment Division—A. L. Riker, chairman.

Report of Electric Vehicle Division—A. J. Slade, chairman.

Report of Broaches Division—C. W. Spicer, chairman.

Friday, June 26, 9.30 A. M.

Professional Session.

Tap Drill Sizes and Causes of Stripped Threads—H. E. Harris.

Report of Motor Testing Division—J. O. Heinze, chairman.

Report of Ball and Roller Bearings Division—Howard Marmon, chairman.

A Proper Basis for Road Vehicle Taxation—C. O. Egerton, Designer, Hudson Motor Car Company; S. I. Fekete, Hudson Motor Car Company.

Proper Characteristics for Automobile Engine Oils—Prof. David L. Gallup, chairman.

24 Detroit Firms Build 41,092 Cars in May

DETROIT, MICH., June 4—During the month of May twenty-four automobile manufacturers of Detroit made a total of 41,092 automobiles according to the figures furnished by the car makers. This total refers to the gasoline cars only as no information was obtained from the electric vehicle manufacturers.

Big as this 1 month's output may seem to be it does not represent, however, the full capacity of the various plants because May is one of the dullest months of the year and several factories are operating with a reduced working force.

Prospects for a larger production in June were expressed, which seems to indicate that the industry is in the very best condition. The general manager of one of the factories told the story in these few words: "Never were we so certain about the future and never did we go ahead with less fear that there might be an overproduction."

The Mexican situation and the unrest in business circles throughout the country do not seem to affect the Detroit automobile builders. Speaking about the matter the head of one of the leading concerns said: "There will be as many automobiles sold as the dealers will have to sell. It's up to the manufacturers to supply them and we have not heard from a single dealer handling our car that we should not ship what he ordered. It seems to me that the people who intend to buy cars are going to buy them, no matter what the country's conditions are. Of course, it would be different if we were at war with Mexico, but there is no fear about that. I think from what I have observed—and I recently have been all through the West—that the estimates of the number of cars the dealers will sell this year will be greatly above the published estimates. The demand is so great that the factories can hardly keep up, even by having day and night shifts. The business is especially good in Illinois, Kansas and California."

One Detroit concern, the Ford Motor Co., has made 24,285 cars in May or 59.1 per cent. of the total made by the twenty-four Detroit manufacturers. The second largest concern's production totals about 4,500 cars and the third largest about 3,000. Seven manufacturers built more than 1,000 cars each.

In general 95 to 98 per cent. of the cars made were disposed of to the dealers in the United States and Canada. "We cannot take up foreign business," said an official of a large concern, "because our agents here in the country want more cars than we can make. It is very good to do foreign business but first you must look after your own people. As long as the demand is so great in the United States let us take care of this first. As far as we are concerned we will go after the foreign trade after we are prepared to take care of it. It would not be a good business policy to try and sell cars abroad and not be able to supply them or have to deprive some of our dealers here of what they want. You cannot conduct a foreign business successfully unless you go at it in a serious manner. That means a systematized organization. Of course we don't call it doing foreign business when you dispose of half a dozen cars during the year. But if you really want to establish yourself abroad or in South America, you must look at it as if you were going to start your business in some of our big states."

Excepting the Ford company, which occupies a position by itself, not only in America but the world, one cannot mention any other of the Detroit companies as having had its best month of May without naming them all. For all report that it has been an exceedingly good month and all are well satisfied.

A. C. of C. Aroused by Kardo Patents

At Annual Meeting of Manufacturers' Body, Col. Clifton Is Re-elected President—An Autumn Truck Convention Recommended —All Committees Report

NEW YORK CITY, June 4—At the annual meeting of the National Automobile Chamber of Commerce, held at headquarters, 7 East Forty-second street, today, Col. Chas. Clifton, of the Pierce-Arrow company, was re-elected president by the representatives of seventy-four companies present, which was the largest to attend a meeting in the history of this organization or its predecessors, the Automobile Board of Trade, and the Association of Licensed Automobile Manufacturers. By his re-election today Colonel Clifton enters upon another cycle of a long period of service-ship with the governing bodies in the automobile industry. For practically 8 years he has been president of either the A. L. A. M., the Automobile Board of Trade, or the latest governing body, namely, the National Automobile Chamber of Commerce.

The other officials elected are as follows:

Vice-president, Wilfred C. Leland (Cadillac).

Second vice-president, Hugh Chalmers (Chalmers), Gasoline Division.

Second vice-president, Windsor T. White (White), Commercial Vehicle Division.

Second vice-president, H. H. Rice (Waverley), Electrical Vehicle Division.

Secretary, R. D. Chapin (Hudson).

Treasurer, George Pope (Pope-Hartford).

General manager, Alfred Reeves.

The Board of Directors consists of the officers and the following:

S. T. Davis, Jr. (Locomobile); C. C. Hanch (Marmon); Alvan Macauley (Packard); W. E. Metzger (Argo); H. O. Smith (Premier); Albert L. Pope (Pope-Hartford); L. H. Kittredge (Peerless); John N. Willys (Overland), and E. R. Benson (Studebaker).

Recommend a Truck Makers' Convention

Much of the time at the annual meeting was taken up with the receiving of reports by the different committees. The Commercial Vehicle Committee in its report recommended a convention of motor truck manufacturers, to be held during the coming fall, the date and other details connected therewith to be determined upon by the committee.

During the year the work of the Traffic Committee has been a most important factor, and this committee which has handled the question of railroad freight cars for the shipment of automobiles throughout the country has checked over 101,000 freight shipping bills of different automobile manufacturers and has accomplished reductions and corrections on these representing a saving of $60,000 to the manufacturers and dealers. This committee is always represented at conferences before the Inter-State Commerce Commission, where questions relative to increase in freight rates on automobiles and accessories are taken up. The committee has now on hand the question of spotting, by which is meant railroads charging for switching cars to loading platforms, etc. Another question is that of dunnage, by this being meant the charge for timbers needed in freight cars when anchoring automobiles for shipment.

The Show Committee reported the dates for both Chicago and New York for next season, which dates will be announced later.

Throughout the entire year the Legislative Committee has been exerting its influence in getting more just laws on the statute books of the different states for the regulation of passenger and commercial vehicles.

Although the work of the Good Roads Committee is not spectacular in character, it has been spectacular in effect, for it has been the means of effectively moulding public opinion during the past year by the wide distribution of literature and the desirability of laying good roads at greater cost rather than cheaper roads at much less cost. The sentiment is now becoming general that it is cheaper in the long run to build a good road that will endure rather than a cheap road that is short-lived.

The report of the Patents Committee was anticipated with greater interest than any of the others due to the recent organization of the Kardo Co., which controls nine patents on rear-axle construction, and which company is controlled by three organizations, namely, Packard, Peerless, and American Ball Bearing Co. When the report of the committee was presented at the general meeting it was the consensus of opinion that it was not ethics on the part of these companies to organize a separate patent-holding organization when the National Automobile Chamber of Commerce has a special patent department and had a patent committee on which both the Packard and Peerless companies were represented, but which representatives resigned some time ago.

Both sides argued the relative matters of the case, the members of the association in general feeling that it was not desirable to have the industry plunged into a heavy patent litigation on rear-axle patents, two of which in the Kardo group, are considered as important patents. The Patent Committee, consisting of C. C. Hanch, chairman, and Windsor T. White, Wilfred C. Leland, L. E. Latta and W. H. Van Dervoort, reported that the committee is conducting an exhaustive examination into all the patents controlled by the Kardo Co.

Col. Miles Sees Fords and Small Motors Abroad

NEW YORK CITY, June 9—Samuel A. Miles, of the National Automobile Chamber of Commerce, has just returned from a 9 weeks' trip abroad, during the course of which he visited England, Scotland and Wales and was for two days in Paris.

The automobile industry in England, where he spent most of his time, appears to be in a flourishing condition, he says, and the remarkable feature of it is the preponderance of very light, small cars selling for approximately £200. The absence of big cars, in fact, is quite noticeable, and among the smaller ones almost every alternate car is a Ford. The majority of these light cars, however, are much smaller than Fords, and, of course, provide accommodations for but two passengers. Other than Fords, the car which appeared most in use is the Hupmobile. Studebakers, Overlands and Buicks also are in general use, as well as the various corresponding types made in England.

The foreign practice of using small, high speed, high efficiency motors already has been commented on by several returned travelers, and Miles says that their use appears to be increasing very rapidly. As an indication of the popularity of this type of motor, he says that even the great London buses are propelled by motors scarcely larger than those used in Ford cars.

Although American makers already have made considerable progress in introducing their cars in England, the number of American cars in use does not appear to be increasing as rapidly as might be expected. This, according to Miles, is due to the fact that there appears to be a moderately strong feeling against cars that are not the product of home labor.

The cyclecar, he says, is quite popular, and, though lots of them are to be seen on the roads, they are greatly outnumbered by slightly larger cars, which are virtually miniature automobiles rather than the narrow tread vehicles which have been given the designation cyclecar.

Although Miles stayed only 2 days in Paris, he, nevertheless, visited the French factory of the B. F. Goodrich Co., where he spent some little time. The plant, he states, is operating at a production of about 200 to 300 tires a day.

In that part of the French domains which Miles visited the small, light car does not appear anywhere near as popular as is the case in England. Instead, the French motorist seems to prefer a considerably larger car, though few of them are as large as the ordinary American car. The French, he says, much prefer a well finished car, and, in some cases, one that is rather showy to one that even appears incomplete or too simple.

Newtone Gets Decision in Horn Suit

United States Circuit Court of Appeals Holds That Claims of Lovell-McConnell Patents Involved in Suit Are Either Invalid or Not Infringed by Automobile Supply Mfg. Co.

NEW YORK CITY, June 9—A surprising turn in the horn war came yesterday when Newtone was awarded a decision over Klaxon in the United States Circuit Court of Appeals for the Second Circuit, sitting in New York City.

The effect of the victory was the reversal of a decree in the District Court for the Eastern District of New York of last January wherein the validity of the Klaxon patents involved in the suit (923,048, 923,049 and 923,122), had been upheld. The Automobile Supply Mfg. Co., Brooklyn, maker of the Newtone horn, may now resume the production and sale of Newtone horns without hindrance by the Lovell-McConnell Mfg. Co., makers of the Klaxon. The bill of the latter company is dismissed and costs charged to the Automobile Mfg. Co., defendant-appellant.

The court held that the broad claims in controversy in the Klaxon patents were invalid and that the claims that covered specific details were not infringed.

Judge Coxe, who wrote the opinion, is of the belief that the A. N. Pierman patent (No. 620,958) granted in 1898 for a bicycle horn—the device consisting of a fixed diaphragm and rotary member, etc.,—has efficacy in dissipating the force of the Klaxon patents granted 10 years later to Miller Reese Hutchison (Nos. 923,048, 923,049 and 923,122). Pierman, who was a witness for the Lovell-McConnell Mfg. Co., in the action, admitted that he only made one or two of the horns and found the manufacture of no commercial promise.

Judge Coxe comes to the conclusion that: "All that Hutchison did was to take the old resonators and connect them up with a rotary electric motor, thereby producing a more startling sound, but adding nothing patentable to the signaling apparatus."

The voluminous quantity of testimony in the record was disparaged by the court, the opinion reading: "The predominant thought left upon the mind of the court is the difficulty of discovering the exact nature of the controversy in this wilderness of words."

Another amazing interpolation in the opinion is Judge Coxe's regret that the automobile alarm makers have not produced pleasing sounds similar to the "musical and merry notes of the coach horn and hunter's horn."

The Lovell-McConnell company brought suit against seven New York dealers handling the Newtone horn and also against the Automobile Supply Mfg. Co. itself. This case was argued before Judge Chatfield of the U. S. District Court, Eastern district of N. Y., May 19-21, 1913, and his decision, handed down Jan. 6, 1914, upheld the Klaxon patents and enjoined the defendant, who appealed almost immediately, filing the brief on appeal in April. The appeal was argued May 5 in the U. S. Circuit Court of Appeals and the reversal of the decision of the lower court by Judge Coxe followed.

Extracts from the opinion of Judge Coxe which are illuminating in connection with the case follow:

The first patent in suit, No. 923,048, has for its object the production of a signaling or alarm horn capable of using as much power and of producing as loud a sound as may be desired by means of simple, strong and reliable combinations. This is accomplished by the mechanical vibration of an elastic diaphragm which, when divorced from technicalities and terms of art, does not seem to be a particularly difficult object to accomplish. A ratchet wheel revolving on the upturned bottom of a tin pan would probably produce a somewhat similar result. We entirely agree with the statement in the brief of the appellee that "The 'horn or resonator' of the patent has been the subject of discussion out of all proportion to the simplicity of the subject."

The patent to A. N. Pierman for an alarm is, we think, the best reference produced by the defendants. It was applied for August 18, 1898, and was granted March 14, 1899, ten years prior to the Hutchison patents in suit. Pierman had in view the same object as Hutchison, namely: "To provide a simple, inexpensive, easily attached and loud-sounding alarm adapted for general use, but more especially for vehicles, as bicycles; and my invention consists, essentially, in the combination, with a point or button carried by a resonant diaphragm, of a transversely corrugated wheel whose periphery engages the point or button." This patent is criticised because the description occupies "less than a single page in length." But, for his brevity and conciseness in this regard, the patentee should, we think, be commended rather than criticised, for in this single page he has made his invention perfectly clear.

It is also true, we think, that Pierman's alarm if made for the first time to-day, would infringe the Hutchison claims. Having been made before, it anticipates. Take, for instance, the first claim of patent No. 923,048 which is here involved. It is No. 16 and is as follows:

"In an alarm or signaling apparatus of the class described, a horn or resonator and a diaphragm, in combination with a rotary member and diaphragm actuating means actuated thereby and adapted to positively displace said diaphragm in one direction and then to permit elastic movement thereof, and high-speed means for driving said rotary member at such rate that the displacements and the elastic movements correspond to a frequency of said horn or resonator."

Pierman's horn is unquestionably an alarm or signaling apparatus. It has a horn or resonator and a diaphragm in combination with a rotary member. It has a diaphragm vibrating means actuated by the rotary member and adapted positively to displace the diaphragm in one direction and permit the elastic movement thereof. It also has high-speed means for driving said rotary member at such rate that the displacements and the elastic movements correspond.

We do not overlook the criticisms made at the argument and in the appellee's brief, but it must be remembered that Pierman was dealing with the situation as it existed in 1898—16 years ago, when bicycles were largely in vogue and before the automobile industry had increased to such enormous proportions. If he had made his improvement 10 years later he would probably have shown it in connection with an automobile or would have suggested the few simple mechanical changes necessary, if used in that environment.

We cannot resist the conclusion that all that Hutchison did was to take the old resonators and connect them up with a rotary electric motor, thereby producing a more startling sound, but adding nothing patentable to the signaling apparatus.

Our general conclusion is that the broad claims in controversy of the Hutchison patents are invalid and that the claims which cover specific details, if valid, are not infringed.

The decree is reversed and the District Court is directed to enter a decree dismissing the bill with costs to the defendants-appellants.

That the Lovell-McConnell Mfg. Co. is not dismayed by the decree is shown in a statement by George Cooper Dean, counsel, reading:

The decision applies only in the Second Circuit and does not control the numerous suits against other infringers in other jurisdictions. The situation is favorable for an application for rehearing so as to explain to this Court the "exact nature of the controversy" which the Court found "difficulty in discovering"; or for writ of certiorari to the Supreme Court of the United States; or for re-issue of the patents to narrow the broad claims so as to cover the very valuable Hutchison improvements found in the Klaxon and Newtone without also including the primitive and uncommercial device of the prior Pierman patent.

The patents in issue are only for certain early and now unused forms of Hutchison's original invention. The patent applications for the improvements covering Klaxon Warning Signals and the similar devices now on the market have been kept pending in the Patent Office awaiting the result of this test case.

These patents will now be issued with claims for the special improvements which have made the present-day motor-driven warning signals commercially successful.

Of these, one patent with claims covering the defendant's Newtone Superior, was issued on April 21, 1914, No. 1,094,403, and suits will be filed on this patent immediately if this defendant makes any attempt to market it.

This is really only the beginning of the Klaxon litigation.

The Automobile Supply Mfg. Co. will go ahead as soon as legal technicality allows and will begin to market horns in stock and make up unassembled horns, according to Ralph L. Scott, of counsel for the Newtone. Ten days must intervene before the higher court orders the lower court to reverse the decree against Newtone but, said Scott, "we may be able to have the injunction suspended immediately. We will try, at least.

"We anticipate no further difficulty of any sort whatever. We do not believe the Klaxon patents can be brought to bear in any form in the face of this decision. We secure our costs in both courts; while I am merely guessing, they may be about $5,000.

"We are going ahead and expect to open the eyes of the trade which we believe has been much in sympathy with us throughout this litigation. Under the decision of the lower court we were absolutely tied up and could do nothing."

Decision Brings N. Y. Taxicab Rates Down

NEW YORK CITY, June 10—The new taxicab ordinance for New York City has been upheld by the Court of Appeals. In deciding the appeal of the Waldorf-Astoria Hotel Co., the Court has sustained the denial of Justice Seabury to continue an injunction obtained by certain taxicab companies and hotels restraining the city from enforcing the ordinance.

Taxicab fares all over the city will accordingly be reduced from 80 to 50 cents for the first mile.

Syracuse Speed Laws Found Inconsistent

SYRACUSE, N. Y., June 6—Because, he says, the city ordinance regulating the speed of automobiles is inconsistent with the State highway laws, Judge Ross this week reversed a verdict of $150 awarded to Robert Meckelson against George W. Boyce for injuries received in an automobile accident. Judge Ross said that city ordinances make at least two limitations of speed less than the State requirement of fifteen miles an hour. He says also that it is inconsistent because it does not fix, as required by the State law, punishment for its violation. He thinks this punishment should be specified in the ordinance. He ordered another trial before the same municipal court judge.

Stromberg Proceeds Against Longuemare

NEW YORK CITY, June 6—Charging the Longuemare Carbureter Co., New York City, with infringing the Ahara patent, No. 684,662, and the Richard patent, No. 791,501, the Stromberg Motor Devices Co., Chicago, filed suit this week in the United States District Court in New York City. The action is directed against Ludwig Arnson and Alfred Michaelis, trading as the Longuemare Carbureter Co., at 246 West 59th street.

This suit follows litigation against the Zenith carbureter in Chicago and the proceedings in those cases are cited as grounds for the granting of a preliminary injunction in the Longuemare suit. It is stated that the Richard and Ahara patents were adjudicated in a suit against the John A. Bender Co., a Chicago motor car dealer, whose cars were equipped with Zeniths, and that in an action in the same city against the Zenith company itself a preliminary injunction has been secured as regards the Ahara patent, its claims being recognized as valid.

It is charged that the advertising literature of the Longuemare company is very similar to the description of the Stromberg device. The claims in the Ahara patent at issue are especially 1, 2, 4, 5 and 7, and apply to a construction which causes an ample supply of fuel for starting and prevents the gasoline taken in becoming excessive as the suction increases with the motor speed. The Richard claims at issue are 8, 10 and 11; this patent is somewhat similar to that of Ahara.

Fisk Heads New Knox Motors Co.

SPRINGFIELD, MASS., June 10—*Special Telegram*—By a decision just handed down by Judge Morton in the U. S. Court, the last question in the transfer of the old Knox company to the new Knox Motors Co., of Springfield, has been settled. Judge Morton has confirmed the sale of the entire plant and property to E. O. Sutton, who is now treasurer of the new company. H. G. Fisk, treasurer of the Fisk Rubber Co., has been elected president of the new company.

The Knox company has had the nucleus of a dealers organization through branches in New York City, Boston, Chicago and Kansas City and these will be continued and the organization enlarged. The production department had already partially completed systematizing the factory, and the effect of Judge Morton's decision is to make possible the unification of the entire Knox organization in a way not practicable heretofore.

An immediate result of the confirmation was the issuing of production orders for a number of Knox Martin tractors and a quantity of fire apparatus of the latest designs. The latest Knox model touring cars were coming through the factory at the time.

American Efficiency Survey Makes Tests

NEW YORK CITY, June 8—Tests of three motor car parts have been made by the American Efficiency Survey of Motor Car Units, which was formed several weeks ago. Upon the results shown the manufacturers have adopted plans for advertising the parts shown to be the best. The tests are made at Purdue University, Purdue, Ind. The members of the technical committee are also the experts selected by the Master Car Builders' Assn. of America. They are: C. S. Benjamin, dean of the engineering schools at Purdue; L. E. Endsley, professor of railway and mechanical engineering and in charge of the Master Car Builders' tests; M. J. Golden, director of the mechanical engineering laboratories; R. G. Pilkington, resident engineer, and D. O. Francis Harding.

Prest-O-Lite Co. Extends Prosecution of Tank Fillers

In Widespread Campaign Several Injunctions Already Have Been Won Against Competing Gas Dealers

INDIANAPOLIS, IND., June 6—Following the opinion handed down in favor of the Prest-O-Lite Co. by Judge Baker in the United States Circuit Court of Appeals in Chicago, the Prest-O-Lite Co. has instituted a wide-spread campaign against refillers of Prest-O-Lite tanks and has secured several injunctions restraining dealers and refillers from passing out Prest-O-Lite tanks not refilled by that company. Of suits which have not been decided the dates for argument have been set in most cases for the middle of the present month.

One action, which differs somewhat from the majority, is directed against Fancher Bros., motor car dealers in Chicago. The Superior Court for Cook county, Illinois, has been asked to restrain them from having Prest-O-Lite tanks refilled by the Searchlight Gas Co. and from then passing them out to the trade; it is claimed that this refilling is obtained at less cost than the charge of the Prest-O-Lite Co. and that a greater profit is made possible to the dealer. The Prest-O-Lite Co. also asks an accounting and damages.

Preliminary injunctions against refilling have been obtained against: Robert Widrig, Detroit; Henry C. Hemmeter, Pontiac, Mich.; Roy O. Perry, Lansing, Mich., and K. E. Baber, Richmond, Va., trading as the Autolite Gas Plant.

Suits filed but not decided are against: Matthew C. Wohlscheid, Grand Rapids, Mich.; S. M. Sturgiss, Jackson, Mich.; Leo E. Mann, Saginaw, Mich.; Benjamin Eicher and W. H. Caldwell, Waterloo, Ia., trading as the Autolite Co.; Willis W. Woods, Cedar Falls, Ia., trading as the Cedar Falls Garage; Eldon J. Perry, South Bend, Ind.; Fred J. Pagels and the Gas Tank Recharging Co., Milwaukee, Wis.

Argument has been heard in the Prest-O-Lite's suit in Newark, N. J., against Camille Bourneville, an alleged refiller, and the appeal in the suit against Coughlin & Davis, Searchlight dealers, is scheduled to be heard June 11 in the United States Circuit Court of Appeals in Cincinnati. The lower court decided for the Prest-O-Lite Co.

With the exception of the action against Fancher Bros. all of the litigation is in the United States District Courts.

April Car Exports Total $2,833,154

3,291 Passenger Cars and Trucks—Last Year 2,766, Value Amounting to $2,904,224

WASHINGTON, D. C., June 9—*Special Telegram*—Three thousand two hundred ninety-one passenger cars and commercial vehicles were exported during April, according to the latest figures compiled by the Federal Bureau of Statistics. The value was $2,833,154. For the corresponding month of last year, the number was 2,766 and the value, $2,904,224.

For the 10 months, ending with April, the exports were 23,762 cars, valued at $21,598,810 in 1914, and 20,096 cars valued at $20,666,593 in 1913.

Reo to Pay 15 Per Cent. Dividend

LANSING, MICH., June 5—A 15 per cent. cash dividend, payable July 1, was declared to-day by the Reo Motor Car Co. This dividend consists of 2½ per cent. regular quarterly payment and 12½ per cent. extra and is declared on a total capitalization of $3,000,000 of common stock. Only a few weeks ago the common stock was increased from $2,000,000 to $3,000,000 and the stockholders received a stock dividend of 50 per cent.

NEW YORK CITY, June 8—The Ford Motor Co., Detroit, Mich., has been authorized by a government decree of March 18 to establish a branch or agency in the Argentine Republic.

U. S. Tire Makes Financial Statement

NEW YORK CITY, June 8—The United States Tire Co, incorporated under the laws of New York, has filed with the Massachusetts secretary of state a statement of its financial condition, dated March 31, 1914, compared as follows:

	1914	1913
ASSETS		
Real estate and investments	$ 91,953	$ 330,474
Merchandise, etc.	6,192,380	9,395,452
Cash and debts receivable	5,475,129	4,193,728
Total	$11,759,462	$13,919,654
LIABILITIES		
Capital stock	$ 500,000	$ 500,000
Accounts payable	11,158,978	12,925,511
Reserve	100,484	494,143
Total	$11,759,462	$13,919,654

Market Reports for the Week

This week's markets saw few changes. The most important change was the reduction in price of gasoline, which came down to $0.14 a gallon. Tin remained unchanged, closing at $30.65 per 100 pounds. The rubber market was quiet with prices generally steady. Both Bessemer and Open-Hearth steels came down $0.50 per ton. Beams and channels came down $0.05 per 100 pounds. Lead remained unchanged. Refined copper was dull and nominal, domestic consumers holding off and producers making no further efforts to sell, prices being quotable still at $0.14 delivered in 30 days for electrolytic for delivery during the next 60 to 90 days.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Changes
Antimony	.05¾	.05¾	.05¾	.05¾	.05¾	.05¾	.....
Beams & Channels, 100 lbs.	1.31	1.26	1.26	1.26	1.26	1.25	—.05
Bessemer Steel, ton	20.00	19.50	19.50	19.50	19.50	19.50	—.50
Copper, Elec. lb.	.14	.13⅞	.13⅞	.13⅞	.13⅞	.13⅞	—.00⅛
Copper, Lake, lb.	.14⅛	.14	.14	.14	.14	.14	—.00⅛
Cottonseed Oil, bbl.	7.25	7.25	7.23	7.26	7.33	7.33	+.08
Cyanide Potash, lb.	.17	.17	.17	.17	.17	.17	.....
Fish Oil, Menhaden, Brown	.40	.40	.40	.40	.40	.40	.....
Gasoline, Auto, gal.	.16	.14	.14	.14	.14	.14	—.02
Lard Oil, prime	.93	.93	.93	.93	.93	.93	.....
Lead, 100 lbs.	3.90	3.90	3.90	3.90	3.90	3.90	.....
Linseed Oil	.54	.54	.54	.54	.54	.54	.....
Open-Hearth Steel, ton	20.00	19.50	18.50	19.50	19.50	19.50	—.50
Petroleum, bbl., Kans., crude	.75	.75	.75	.75	.75	.75	.....
Petroleum, bbl., Pa., crude	1.80	1.80	1.80	1.80	1.80	1.80	.....
Rapeseed Oil, refined	.59	.59	.59	.59	.59	.59	.....
Rubber, Fine Up-River, Para	.70	.71	.71	.70	.70	.70	.....
Silk, raw, Ital.	..	5.10	..	..	5.10	5.10	.....
Silk, raw, Japan	..	4.50	..	..	4.45	4.45	—.05
Sulphuric Acid, 60 Baume	.90	.90	.90	.90	.90	.90	.....
Tin, 100 lb.	30.65	30.95	30.50	30.45	30.65	30.65	.....
Tire Scrap	.04¾	.04¾	.04¾	.04¾	.04¾	.04¾	.....

Pope Wants to Continue for 3 Months

HARTFORD, CONN., June 5—A petition for the approval of the semi-annual report was presented by Colonel George Pope, receiver of the Pope Manufacturing Co., to Judge William L. Bennett in the superior court today. The receiver asked permission to continue the business of the company in this state for another 3 months after June 22.

The receiver says that he confidently expects before the expiration of that time, unless the stockholders or creditors have been able to present some favorable plan for reorganization involving the purchase of the plants as a whole, he will be obliged to recommend cessation of manufacturing operations and forced liquidation.

Referring the court to schedules on file the receiver says it will be evident that there will be but one question as to the future conduct of the business on which there can be any difference of opinion. All the product now in the course of manufacture must be completed and sold, excepting possibly 150 Model 35 cars, which are not yet in finished parts. The receiver recommends the manufacture of these cars be pushed as speedily as possible.

Reference to the schedule shows that there is on hand parts and material valued at $22,217 expressly suitable for 150 cars of the Model 35 type, which is the four-cylinder model now being turned out in the local plant. How much of the raw material, finished parts, supplies, etc. ($168,-038.13), can be used in the completion of these 150 cars is problematical. A considerable part can be used thus, turning an item which cannot be profitably sold in its present state into marketable merchandise. In addition as it is necessary to finish the cars now in process, the overhead expense will be largely reduced by spreading it over an additional 150 cars, the receiver says. A comparative statement of assets shown by the receiver's inventory of October 27, 1913, and an inventory of the receiver's books of April 30, 1914, is made. The inventory of October 27, 1913, totals $1,853,438.66, and that of April 30, 1914, foots $1,905,469.13.

A 10 Per Cent. Canadian Ford Dividend

DETROIT, MICH., June 6—Stockholders of the Ford Motor Co., Ltd., of Walkerville, Canada, received a 10 per cent. dividend this week. The total distributed amounts to $100,000, which is equal to 10 per cent. of the Canadian company's capital stock, which is $1,000,000. The Canadian Ford company was organized in 1904, and has been doing good business ever since, paying dividends annually, but this year's dividend is the largest as yet paid.

NEW YORK CITY, June 8—The Rubber Goods Mfg. Co. has declared a dividend of 1 per cent. on the common stock, and a regular quarterly dividend of 1¾ per cent. on the preferred. Both are payable June 15 to stock of record June 10. Three months ago a dividend of 3 per cent. was declared on the common stock.

Vulcan Truck Is Made by Driggs-Seabury

NEW YORK CITY, June 6—In THE AUTOMOBILE for June 4, 1914, page 1171, in tabulating trucks of 5 tons and over it was stated that the Vulcan truck was made by the Veerac Motor Co. This was a typographical error. The Vulcan truck is manufactured by the Driggs-Seabury Ordnance Corp., Sharon, Pa., while the Veerac is the product of the Veerac Motor Co., Anoka, Wis.

Gasoline Down to 14 Cents in N. Y.

NEW YORK CITY, June 8—The price of gasoline has again come down. It is now selling in Greater New York and Long Island at 14 cents by the Standard Oil Co., of New

York. On June 2 it fell from 16 to 15 cents. The Texas Co. is also selling its gasoline at the same price in this territory. But in New Jersey, it is being sold at retail for 13 1-2 cents. The decline is said to be in sympathy with general reductions in petroleum products.

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NEW YORK CITY, June 8—The Texas Co. has declared its regular quarterly dividend of 2½ per cent., payable June 30. The previous quarterly dividend was at the same rate, having been increased from 1¾ per cent., declared in the last quarter of 1913.

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Goodrich Aiming at 2,000,000 Tire Output

NEW YORK CITY, June 8—There is a very good possibility that this year's output of tires by the B. F. Goodrich Co., will run into the second million. "Two Million Tires" is the Goodrich slogan. At present the company is producing an average of 10,000 tires a day, which is at the rate of 3,000,000 a year. But this won't last as operations are always at maximum during the automobile season. The Akron plants of the company are now running 24 hours a day, and the business of some of the other tire companies is in the same flourishing state.

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Alcohol Fuel Committee Solicits Support

LONDON, ENGLAND, May 30—At a luncheon held at the Royal Automobile Club the subject of support for the alcohol fuel committee was discussed. Attention was called to the strenuous efforts made in the United States to bring this fuel to the attention of the users of industrial engines and resolutions were passed to support the committee in its work. A discussion of the subject by members of the committee showed optimistic views as to the future of alcohol, especially in the tropical countries of rapid agricultural growth.

—

Shanks to Direct Premier Sales Work

NEW YORK CITY, June 8—Chas. B. Shanks, a pioneer in the selling and advertising departments of the automobile industry, is to become sales and advertising director of the Premier Motor Mfg. Co., Indianapolis, Ind. Mr. Shanks has been almost continuously active in the industry since the earliest single-cylinder days. For nearly 10 years he was sales and advertising manager of the Winton company. Latterly he has filled the position of business manager of the Class Journal Co., of New York, publishers of THE AUTOMOBILE, *Motor Age*, *Motor World* and *Motor Print*. Mr. Shanks will assume his new post about June 15. The status of Messrs. Macey and Bieling, sales and advertising managers, respectively, will not be affected by Mr. Shanks' entry into the Premier organization.

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S. A. E. To Discuss Glare Dimming Devices

NEW YORK CITY, June 10—The Metropolitan section of the Society of Automobile Engineers will discuss headlight dimming devices at a meeting to be held at the Autombile Club of America in this city Thursday evening, July 2. Makers of these devices have been invited to attend and it is purposed to illustrate the various devices. Competition is keen among the makers and a warm debate is expected.

Automobile Securities Quotations

NEW YORK CITY, June 10—The automobile securities market, like the general stock market, reflects the general business conditions said to be prevalent throughout the country in its records for the past week. Very little trading is being done in any of the stocks and but slight changes are to be noted as will be seen by inspection of the following tabulation giving the bid and asked quotations of practically all the important automobile and accessory stocks on the market, together with the figures of the same stocks of the corresponding week in 1913 and the changes registered:

Security	Wednesday Bid	Wednesday Asked	Thursday Bid	Thursday Asked	Friday Bid	Friday Asked	Saturday Bid	Saturday Asked	Monday Bid	Monday Asked	Tuesday Bid	Tuesday Asked	Week's Change	1913 Bid	1913 Asked
Ajax-Grieb Rubber Co. com	220	..	220	..	220	..	200	..	220	..	220	..	..	150	..
Ajax-Grieb Rubber Co. pfd	99	..	99	..	99	..	99	..	99	..	99	..	..	95	100
Aluminum Castings pfd	98	100	98	100	98	100	98	100	98	..	98	..	..	98	100
Case T. M Co., J. I	84⅞	90	84⅞	90	84⅞	87½	84⅞	87½	84⅞	90	84⅞	90	..	..	..
Chalmers Motor Co. com	101	107	101	107	101	107	101	107	98	102	93	102	—3	125	135
Chalmers Motor Co. pfd	92½	95	92½	95	92½	95	92½	95	94	96	94	96	+1½	98	102
Electric Storage Battery Co	51¾	52	51¾	52	52	53	52	52¼	51	52	53	53¼	+1	..	..
Firestone Tire & Rubber Co. com	305	309	305	309	305	309	305	309	305	310	305	310	..	230	240
Firestone Tire & Rubber Co. pfd	107	110	107	110	107	110	107	110	108	110	108	110	+1	105	107
Garford Co. pfd	75	85	75	85	75	85	75	85	75	85	75	85	..	..	97½
General Motors Co. com	92	94	94	95⅜	94	95	94	95	93½	94½	93½	94½	—2¾	24	26
General Motors Co. pfd	93	94	93⅛	94	94½	95	94½	95	94½	95½	94½	95½	+1½	70	72
B. F. Goodrich Co. com	24⅜	25	24½	25	24½	25⅛	24½	24¾	24	25	24	25	— ½	25	26
B. F. Goodrich Co. pfd	88	89⅛	88½	89¼	88	89½	88⅛	89	88	89½	88	89½	..	88	89
Goodyear Tire & Rubber Co. com	172	176	172	176	172	176	172	176	170	175	170	175	—2	..	302
Goodyear Tire & Rubber Co. pfd	98	99½	98	99½	98	99½	98	99½	97½	99	97½	99	— ½	98	99½
Gray & Davis Co. pfd	95	102½	95	102½	95	102½	95	102½	95	102½	95	102½	..	..	..
International Motor Co. com	..	5	..	5	..	5	..	5	..	5	..	5	..	4	6
International Motor Co. pfd	3	10	3	10	3	10	3	10	3	10	3	10	..	10	15
Kelly-Springfield Tire Co. com	57	58	60	65	63	66	63	66	63½	64½	63	66	+7	..	..
Kelly-Springfield Tire Co. pfd	140	150	140	150	125	150	145	150	138	142	140	150	..	..	..
Lozier Motor Co. com	..	25¼	..	25¼	..	25¼	..	25¼	..	23½	..	23½	..	15	20
Lozier Motor Co. pfd	30	43	30	43	30	43	30	43	30	43	30	43	..	..	92
Maxwell Motor Co. com	14	14¼	14	14¼	14	14¼	13⅞	14⅛	14	14¼	14⅛	14⅜	+ ⅜	2	5
Maxwell Motor Co. 1st pfd	43	45	43	44	42½	44	42½	43	42½	44	44	44½	+1	30	35
Maxwell Motor Co. 2d pfd	17¾	18¼	17½	18	17½	18	17¾	18¼	17½	18	18⅛	18½	+ ⅝	8	12
Miller Rubber Co	128	135	128	135	128	135	128	135	128	135	128	135	..	135	145
New Departure Mfg. Co. com	123	125	123	125	123	125	123	125	123	125	123	125	..	..	..
New Departure Mfg. Co. pfd	105	107	105	107	105	107	105	107	105	107	105	107	..	..	..
Packard Motor Co. com	103	..	103	..	103	..	103	..	103	..	103	..	..	..	..
Packard Motor Co. pfd	98½	100½	98½	100½	98½	100½	98½	100½	97	100½	97	100½	—1½	..	..
Peerless Motor Co. com	18	25	18	25	18	25	18	25	18	25	18	25	..	40	50
Peerless Motor Co. pfd	..	62½	..	62½	..	62½	..	62½	..	62½	..	62½	..	..	96
Pope Mfg. Co. com	..	1½	..	1½	..	1½	..	1½	..	1½	..	1½	..	10	12
Pope Mfg. Co. pfd	..	8	..	8	..	8	..	8	..	8	..	8	..	40	46
Portage Rubber Co. com	..	40	..	40	..	40	..	40	..	40	..	40	..	35	40
Portage Rubber Co. pfd	..	90	..	90	..	90	..	90	..	90	..	90	..	90	95
*Reo Motor Truck Co	9½	9⅞	9½	9⅞	9½	9⅞	9½	9⅞	9½	10	9½	10	..	..	11¾
*Reo Motor Car Co	18	†19	18	†19	18	†19	18	†19	18	20	18	20	..	20	22½
Rubber Goods Mfg. Co. pfd	100	110	100	110	100	110	100	110	100	110	100	110	..	..	..
Russell Motor Co. com	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Russell Motor Co. pfd	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Splitdorf Electric Co. pfd	40	50	40	50	40	50	40	50	40	50	40	50	..	..	..
Stewart Warner Speedometer Corp. com	47½	48½	47½	48½	47½	48½	47½	48½	47	48½	47	48½	— ½	..	..
Stewart Warner Speedometer Corp. pfd	97	99	97	99	97	99	97	99	97½	99½	97½	99½	+ ½	..	..
Studebaker Co. com	33¼	33¾	33	34	33⅜	34	33	34	34	35	34	35	+ ½	20	23
Studebaker Co. pfd	88½	90	87½	88¾	87½	89	87½	89	89½	90½	89½	90½	+1	82	85
Swinehart Tire & Rubber Co	73	80	73	80	73	80	73	80	70	80	70	80	—3	85	90
Texas Company	145½	146½	146½	146⅞	147½	147⅝	147¼	147¾	146½	147½	146½	147½	+1½	..	..
U. S. Rubber Co. com	58½	58¾	58½	58¾	58¼	58¾	58¼	58¾	58½	59	58½	59	— ⅛	53	54
U. S. Rubber Co. 1st pfd	102	102½	102½	102¾	102½	103	102½	103	102½	103	102½	103	+ ¼	100	100¼
Vacuum Oil Co	225	230	226	230	225	230	226	228	226	229	226	228	+2	..	..
White Co. pfd	107	110	107	110	107	110	107	110	107	110	107	110	..	107	110
Willys-Overland Co. com	78	79	74	76	74½	75½	74	76	74	75	77½	79	— ½	50	55
Willys-Overland Co. pfd	94	96	93	95	93	95	93	95	93	95	93	95	—1	76	85

*The par value of these stocks is $10; all others $100. †Ex dividend.

New Record for Targa Florio Road Race—SCAT Wins

38.9 Miles per Hour Average by Winner in 2 Days' Race—Previous Record Held by Nazarro Car

PALERMO, SICILY, May 26—La Targa Florio, the only long-distance road race left on the European calendar of automobile sports, was run on May 24 and 25. The course follows roughly the coast line of Sicily, covering 1,050 kilometers (655 miles). It was won by Ceirano on a SCAT car in 19:45:26. There followed Colombo in a SCAT (19:45:53), The best previous record on the same circuit was Nazarro's of 19:18:40. Lopez, an amateur driving a Fiat, was third in 19:45:26. There followed Colombo in a SCAT (19:45:53), fourth, Cortese in a Nazarro car (19:58:11), fifth, and Lucca in an Elka (19:58:52), sixth.

Nazarro also took part in this race and was among the leaders and favorites on the first day; on the second day a bolt was broken in the torsion rod of his car and he abandoned the contest. The Nazarro car driven by Cortese suffered the same accident but was repaired.

What gives to the Targa Florio race its peculiar position among events can be summed up under three heads: It is a real road race, like those of early automobile days; no portion of the course is covered more than once; the roads are unguarded and the drivers must constantly look out for the unexpected—herds of goats, youngsters, carts; it is a race for which one man, Vinzenso Florio, has managed to work up and maintain great local enthusiasm and which, since its inception in 1906, has done much to open up Sicily as a touring ground, with incidental benefits for civilization and real-estate values on this once highly prosperous island.

Thirty-four entries were listed and 31 made the start. The cars were mostly of Italian manufacture, the exceptions being only 1 Renault, 1 De Dion-Bouton, 1 Ford, 1 Peugeot, 1 Dietrich, and 1 Benz. The drivers were mainly amateurs and, apart from the first and second winners, those who finished were rated in that class, taking part for love of sport or motives of patriotism. The popular interest was greatly stimulated by the organization of the automatic betting system known as the *Pari mutuel* or totalisator scheme, by which the tribute to bookmakers is avoided and fair play assured. The Nazarro team of 2 cars, the Aquila-Italiana team of 3 cars, driven by Marsaglia, Constantini and Ruggerone, and the SCAT team of 4 cars, driven by Ceirano, Snipe, Colombo and Poni, were the favorites in the betting, as Ceirano had won the race in 1911, on a shorter circuit. and Snipe and Nazarro had won it in 1912 and 1913, respectively, while Marsaglia in 1913 gave Nazarro a close tussle. After the returns began to come in, the populace assembled in great numbers before the quarters of the Automobile Club of Sicily, at Palermo, where bulletins were posted as fast as they came in—and the telegraphic service was elaborate and rapid—and the dense crowd held its place under incessant and vociferous excitement for 48 hours. It was impossible to say where the love of sport ended and the Sicilian's inveterate love of gambling began. Many of them were women.

Starting and ending at Palermo, the race takes in most of the cities of Sicily. On the first day Snipe was ahead until he broke an axle, and Marsaglia in his Aquila led him into Messina, closely followed by Ceirano and Cortese. The day's run ended at Syracuse (496 kilometers) and here the order of the leaders was 1. Ceirano in SCAT (7:40), 2. Sivocchi in De Vecchi (7:53:3), 3. Nazarro and 4. Cortese, both in Nazarro cars (7:56:8 and 7:57:32), 5. Marsaglia in Aquila (8:2:55).

Second Day Decisive

The favorites were thus neck and neck for the beginning of the second day, and a sharp contest was in prospect on the sinuous and hilly roads which try the brakes, the springs, the motors and the skill of the drivers to the utmost. Only Ceirano survived the ordeal, keeping his lead. while Nazarro. Marsaglia and Snipe were eliminated before the end. Sivocchi ran into a mile-stone, Marsaglia broke a wheel spindle. Nazarro and Cortese, as mentioned, each the same identical bolt in their cars. Ceirano's car was the same vehicle in which Snipe won the race in 1912, improved in details, however; it is a stock car of 30 horsepowers, with 4-cylinder motor of 100-millimeter bore and 150-millimeter stroke. Ceirano himself, is an automobile engineer of the second generation of motorists, a son of the elder Ceirano of the SCAT company, a relative of the Ceiranos identified with the Itala and the SPA companies. Gloria who followed him in a De Vecchi is a car tester. The Fiat which was third was not entered by the company but by its amateur owner.

The race for the Florio cup trophy, which in other years has been disputed jointly with the Targa Florio, was scheduled to be run this year, on May 31, over three laps of the shorter Madonia course.

300-Inch Limit for 1915 Speedway Motors

INDIANAPOLIS, IND., June 8—The management of the Indianapolis Speedway has made several changes in the regulations for the 500-Mile race to be held in 1915. The cubic inch piston displacement limit has been cut from 450 to 300, the minimum weight, however, remaining the same at 1,600 pounds. One idea in this change is to reduce the fuel consumption in the race, thereby cutting down the number of necessary stops at the pits. These specifications are expected to stay in force at least three seasons after which it is possible that a further reduction will be effected, the final goal being displacement of less than 161 cubic inches. The speedway management considers that the new regulations will put automobile racing into the experimental division of the industry, where, properly, it belongs and in which category it has been considered by Europeans for some years past.

Further changes will be made in the equipment of the Speedway, the surface of the track will be widened 15 feet on the inside and retaining walls built all around to render high speed work more safe.

Peugeots and Delage for Sioux City Races

NEW YORK CITY, June 10—The Delage car No. 16, which won the Indianapolis 500-mile race with Réné Thomas at the wheel, has been sold to James E. Wilson, Rochester, N. Y., and it will be entered in the Sioux City speedway meet July 24, and in the Elgin races August 22. William Knipper is scheduled to drive in both contests. The Peugeot car driven by Boillot, at Indianapolis, will appear at Sioux City and Elgin as the entry of the Peugeot Auto Import Co., with Ralph Mulford at the wheel unless Bob Burman is successful in securing it for L. C. Erbes, of Minneapolis, Minn., who is said to be backing the speed king this year. Should this occur, the Peugeot importers will enter another Peugeot with Mulford driving. Paul G. Stamm, of New York City, is entering the Peugeot driven by Zuccarelli in the Indianapolis race in 1913 for Sioux City and Elgin with Stringer driving. There will probably be a third Peugeot in both contests.

M. M. Hughes has been engaged as a third driver of the Maxwell team which will race at Tacoma, Wash., July 4. It is said that W. E. Flanders, president of the Maxwell company, has authorized Ray Harroun to start work immediately on three more Maxwell racers for the 1915 Indianapolis race. These will be in the 300-inch class, according to the new regulations.

W. F. Bradley, manager of the foreign participants in the 500-mile race, sailed for Europe Saturday with Thomas, Guyot, Christiaens, Goux and Boillot.

Ralph DePalma has sailed for Europe, where he will drive an English car, the Vauxhall, in the French Grand Prix.

Ceirano in SCAT, which won Targa Florio race in Sicily

Big Alpine Tour Next Week; 3 U. S. Cars Among 74 Entries

Three Overlands, 3 Cadillacs and a Chevrolet in Precarious 1,750 Mile Run and Hill Climb

VIENNA, AUSTRIA, May 25—In the Austrian tour of the Alps which is to take place June 14 to 23 over a total distance of 1,750 miles, America will be represented, seven of the seventy-four cars entered being made in the United States. These seven cars are three Overlands, three Cadillacs and one Chevrolet. While the proportion of American cars is not as great as it could and should have been in such an important contest, the progress of the Yankee motor cars will be watched with the keenest interest as the motoring public is becoming more and more interested in American automobiles. And it is just such events, of international importance, which will help the unknown or little known to become as much talked about as the old established cars.

Eleven Teams to Take Part

Of the seventy-four cars which have been entered there are twenty-four Austrian, twenty-one German, seven Italian, five Belgian, five English, four French and the seven American cars. For the team contest eleven concerns are represented, each with three cars, these teams being the Overland, Cadillac, Austrian-Daimler, Minerva, Darracq, Austrian-Fiat, N. A. G., Hansa, Audi, Puch and Laurin-Clement. There is one entrant whose car has not yet been named.

The tour will start from Vienna on the morning of June 14, the night stopping place being Klagenfurt, 244 miles from the capital. On this journey five passes will be climbed, the highest point to be passed being at 3,400 feet above the sea level. On the second day the contestants will drive from Klagenfurt to Triest, a distance of 229 miles on good roads. On the third day, Triest to Toblach, 240 miles. The highest point on the route is the top of the Kreuz mountain, 3,000 feet in elevation. Some of the highest passes on the tour are on the fourth day's route of 231 miles from Toblach to Meran. But the tourists will not know until the fifth day what mountain automobile driving in the Alps is, when the rather short distance of 113 miles, from Meran to Innsbruck, will have to be covered. This is, according to automobilists who have toured extensively in Europe, the most difficult and dangerous course that can be found in the old world. The sixth day the route is from Innsbruck to Villach, 228 miles, including the Katschberg, upon which the hill climbing trials will be held. On the next day the tour is from Villach to Salzburg 239 miles and on the last day from Salzburg to Vienna, 230 miles.

This year's hill climb will be a novelty inasmuch as a minimum speed will have to be maintained ranging from 7.5 miles to 23 miles per hour, according to cylinder area. The climb will be held over a course of 3 3-4 miles, the gradient averaging 1 in 4. There will also be a speed trial over a course of 6 1-4 miles and the cars will have to maintain an average speed according to a special schedule.

The tour is promoted by the Austrian Automobile Club and members of the Austrian nobility will be among the starters. In fact, the two first cars to be entered, two Puch cars, were entered by Archduke Joseph Ferdinand and Archduke Henry Ferdinand.

Cortese on Nazarro, fifth. Note character of road

Transcontinental Saxon starting from the Atlantic ocean

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Drop Chicago-Boston Reliability

CHICAGO, June 8.—Inability to secure enough entries to make the run a success has caused the Chicago Automobile Club to call off the Chicago-Boston day and night non-motor stop reliability, scheduled for June 28-July 2, for which the Glidden, Anderson and National trophies were offered. After a month's search the only nominations actually filed were Thomas J. Hay's Hupmobile in the Anderson cup division and A. M. Robbins' Jeffery in the owners' class. Several of the manufacturers had promised support, but as it looked impossible to get more than a dozen entries the club thought it best to drop the event.

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Saxon on 3,400-Mile Lincoln Highway Rim

NEW YORK CITY, June 9—The little Saxon car, which started out from this city on June 4 for San Francisco, has reached Canton, O., with a total mileage of 539 miles. M. A. Croker, driving the car, averaged 25 miles per gallon of gasoline over the Pennsylvania hills. Except for the first day, when the run was made through continuous rain, good weather conditions have favored the car.

The car expects to make the trip in 30 days, the journey being made by way of the Lincoln Highway, a distance of 3,388 miles. The car will run on a daily schedule mapped out in advance, and will finish its trip at San Francisco on July 4. The trip undertaken by this car is interesting because of the fact that this is the first small car to make a trip from coast to coast.

Thus far the little car has kept to its schedule, reaching Trenton, York, Pa., Bedford, Salem, O., and Canton, on time. The tentative schedule that will be followed insofar as weather conditions permit, is as follows:

June 9, Elkhart, Ind.; 10, Chicago Heights; 11, Clinton, Ia.; 12, Cedar Rapids, Ia.; 13, Boone, Neb.; 14, Omaha, Neb.; 15, Columbus, Neb.; 16, Kearney, Neb.; 17, North Platte, Neb.; 18, Kimball, Neb.; 19, Cheyenne, Wyo.; 20, Denver, Col.; 21, Cheyenne, Wyo.; 22, Elk Mountain Hotel, Wyo.; 23, Granger, Wyo.; 24, Salt Lake City, Utah; 25, Kearney's Ranch, Utah; 26, Eureka, Nev.; 28, Alpine Post Office, Nev.; 28, Fallon, Nev.; 29, Reno, Nev.; 30, Colfax, Nev.; July 1 and 2, Sacramento, Cal.; 3, Stockton, Cal.; 4, San Francisco, Cal.

This car is the same one that recently made the trip of 130 miles a day for 30 consecutive days at Detroit. It still carries the original set of tires. The car is driven by M. A. Croker and Fred Wilkins. Before the little car started on its journey, there was a luncheon downtown at Delmonico's. H. W. Ford, president of the Saxon Motor Co.; L. A. Van Patten, the local dealer; J. C. Wetmore and Elmer Thompson, secretary of the Automobile Club of America, were among the speakers.

Fix Compensation Rate Basis

324 Per Cent. of Massachusetts Rate—Insurance Rates Are Not Yet Determined

NEW YORK CITY, June 10—The New York Insurance Dept. has determined the basis of the new workmen's compensation insurance rates in this state. This basis of rates will be the pure premium as shown under the experience of Massachusetts in the past, plus 8 per cent. for lack of experience and the disaster hazard, the result to be multiplied by two as representing the greater benefits under the New York law and then loaded 33 1-3 per cent. for managerial and acquisition cost. In other words, the rates will be 108 per cent. of the Massachusetts pure premiums multiplied by three, or 324 per cent. of the Massachusetts experience loss cost.

These rates will be formulated for New York on this basis and issued by the Insurance Dept. within a few days, not later than June 15. The department now has in preparation a manual constructed on the foregoing formula, which will be ready in printed form at that time. Companies that submit manuals which conform to the department minimum rates, or that provide for adequate rates in excess of such minimum rates, will receive department approval as a matter of course.

A plan is now being formed by which employers will receive the benefit of an early credit on basis of inspection and experience by a central inspection rating bureau. This will be composed of the various insurance carriers in the state, and will be under the supervision of the department.

The workmen's compensation insurance rates to be charged by the State Fund have not yet been formally determined, but it is understood that the State Fund's manual of rates will be equal to the minimum rates prescribed by the New York Insurance Dept. for stock and mutual companies, less 10 per cent. In other words, the State Fund rates will be 90 per cent. of the companies' rates.

Regulations for self-insurers under the new workmen's compensation law, whereby those desiring to carry their own insurance of compensation risks will be required to deposit with the commission an amount equal to 6 months' premium, has been adopted by the N. Y. Workmen's Compensation Commission. This amount of the deposit must, however, in no event be less than $5,000, and in the event of accidents to employees the compensation payable will be carefully estimated and the sum thus computed paid into the commission, so that at all times the 6 months' premium deposit will be maintained intact.

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1915 Pierce-Arrow 3 Inches Lower

BUFFALO, N. Y., June 8—A double-dropped frame is the most important innovation that the Pierce-Arrow Motor Car Co., of Buffalo, N. Y., is making in their Series Three line, which has just been introduced for the coming season. This results in a marked difference in appearance of the Series Three car from the Series Two, and it has been found possible to lower the body, running board and the entire appearance of the car by reason of the lower frame.

The lowering of the car has resulted in the abandonment of the gravity fuel feed to the engine and the substitution of a pressure feed with the gasoline tank at the rear of the chassis. The placing of the pressure feed on this car has made it possible for the use of a higher carbureter, thus increasing its accessibility and at the same time achieving the desirable feature of shortening the intake manifold.

Other chassis changes to be found in this model are better accelerator and throttle lever; the electric starter is operated by a single push-button on the dash, and in place of the plug formerly used on the dash a Yale lock and key are provided for the ignition switch, making it practically impossible to start the engine if the bonnet be locked and the key removed from the switch. The action of the engine timer has been greatly simplified and a more complete housing covers the universal joint between the clutch and the gearset.

As in 1914, the Pierce-Arrow line will be made up of three chassis, all the motors being sixes, with the cylinders cast in pairs and of the "T" head type. Seven-bearing crankshafts are used and the timing gears have a helical pitch. Single wiring is used for the starting and lighting systems and the starting motor is independent from the generator. The clutch is a cone, faced with leather, the four-speed gearset is mounted amidship, and the axle is a semi-floating bevel drive design.

Many new features of design will be found in the Series Three body. On the two larger cars the forty-eight and sixty-six, the bodies have been lowered 3 inches; on the thirty-eight the bodies are 2.5 inches nearer the ground. The fenders are new and wider and are calculated to give greater protection from mud and water than formerly. A one-man top is now fitted and in the standard touring cars individual front seats are used, arranged so that any one may pass to the left or right side of the car in the front compartment. All cars are right drive and right control. The head lamps are still carried in the fenders, but the bodies are all of entirely new design. They are made of cast aluminum. A full line of equipment is furnished.

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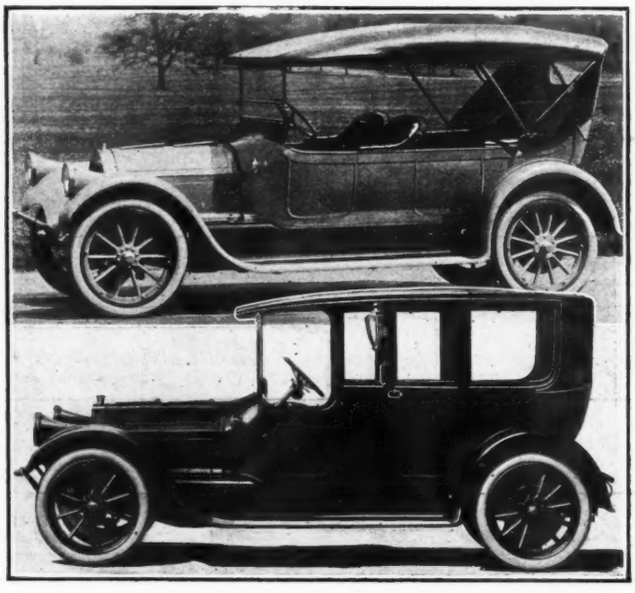
Hold Orphans' Day Outing in New York City

NEW YORK CITY, June 4—The Orphans' Automobile Day Assn. of New York held its tenth annual outing to-day at Witzel's Park. It required fifty-one taxicabs, ninety touring cars, forty trucks and 3 sightseeing cars to transport the 2,500 children from this city to the park. The inclement weather, however, did not spoil the outing, as the children were given every sort of entertainment to make them happy.

Knox tractor hauling big load of orphans



Pierce-Arrow bodies are from 2 to 3 inches lower than last year and are of different design

Dr. Steinmetz Foresees Electric Boom

Famous Electrical Expert Declares That 1,000,000 Light Battery-Driven Vehicles, Costing Under $500, with a 20-Mile-an-Hour Average Speed and 30-Mile Capacity, Will Swarm Our Streets—Great Returns for Central Stations

PHILADELPHIA, PA., June 5—That the automobile of a decade hence would show a complete change from the gasoline to the electric type for transportation from the home to the center of travel and for pleasure was the prophecy made by Dr. Charles P. Steinmetz, expert of the General Electric Company, and the foremost electrical engineer in the world before 5,000 delegates attending the 37th annual convention of the National Electric Light Assn. in session this week at the Bellevue-Stratford. The figures given by the wizard were startling to those present regarding the coming electric car.

Dr. Steinmetz predicted that 10 years from now 1,000,000 moderate-price electric vehicles, whose approximate price would not exceed $500, with a 20-mile-an-hour speed and 30 miles or better their daily range, would be in operation. He also predicted that the high-powered touring car was to be relegated to the general classification of luxuries, and the gas car of any but the most moderate-priced and compact type would be practically eliminated.

The income from charging these cars would bring in to the central station men of the country an added gross revenue of $75,000,000 annually. In addition to this $75,000,000 worth of new current to be charged into a million cars at off-peak periods, Dr. Steinmetz said there was in view another $75,000,000 worth of similar business when the same energies were applied to the extensive development of electric trucks and delivery wagons.

In enumerating the disadvantages of the gasoline car he also took occasion to say that the simplicity of the electric car, its ease in handling, storing and cleaning when appreciated would result in the middle-class families adopting the electric for every-day business. The central station and garage system would put the cost of storing, charging and cleaning the 1,000,000 cars at not more than $10 a month. Figuring on an average of $2 50 a month for extras, this would bring a convenient town and country car within the reach of thousands who cannot now afford a gasoline car and its expensive upkeep.

Against the gas car he said were the cost of oil, and gasoline, the concentration necessary to drive a high-powered car at high speed and the necessity of constant attention to the engine. It will no longer be a machine needed for long cross-country runs, except for the very wealthy. Like long-distance bicycle riding, long-distance driving will fall into disfavor when social leaders drop the sport, he said. The complete report of Dr. Steinmetz' address follows:

The Relation of the Automobile to the Central Station Industry

By Dr. Charles P. Steinmetz,
Consulting Engineer for the General Electric Company

EDITOR'S NOTE—The following is a complete report of the address delivered by Dr. Steinmetz before 5,000 delegates attending the 37th annual convention of the National Electric Light Association at the Bellevue-Stratford in Philadelphia.

"THIS subject on which I desire to speak is the relation of the automobile to the central station industry.

"To understand this relation, I have first to survey the historical development of the automobile as it takes place before our eyes today. Like all sports, the history of the automobile development comprises three stages or periods: the period of initial development; then the period of culmination, where it has been picked up and made the popular dominant sport of society, and then the period of decay as sport, and readjustment in a permanent condition as a business proposition.

"Now, the automobile has not yet reached that latter permanent condition in modern life, and therefore to illustrate the three periods of popular sports, their relation to each other, and the causes leading from the one to the other, I may be permitted to illustrate it on another popular sport. But I wish to draw attention to it that every word I say about this can immediately be applied to the automobile as modern popular sport, as far therein as the development has progressed.

Compares Bicycle and Automobile

"As an illustration I may dwell upon the popular sport of the bicycle, since this has passed through its history and has reached permanent conditions. Now, there we find the initial period of development, the time of the high wheel, the early days of the safety, those times where it required very great enthusiasm and hardihood to stay by it; all that, you see, you can immediately transfer to the early days of the automobile, where it was doubtful when going out, whether the rider and the wheel would come home whole and together. Where even the legal status of the wheel was in doubt. Where the roads to go on did not yet exist. Still, the development slowly but gradually progressing, the wheel became more reliable, and finally a time came when society picked it up as the popular sport.

"Then followed the period of culmination, in bicycling as a popular sport where everybody indulged in it, the young and the old, ladies and gentlemen, the business man and his clerk, the factory owner and his lady stenographer went to work and from work on wheels. In fact, where every Sunday and holiday thousands of wheels went out for cross country riding for long distances, going out into nature, and enjoying the mild pleasant exercise in pushing the wheel. Where it seemed to be the desire of the rider to see how fast he could go and how great a mileage he could roll up. Where century-run riding was a popular sport. The days of the sport when the Wheelmen's Association, when the L. A. W. was a power in the land, making and unmaking laws, where bicycle roads were built all over the country, where bicycle manufacturing companies and repair shops sprang up like mushrooms all over the land.

Rich Drop Sport

"Then the wheel became cheaper, went down in price, so as to be within the reach of everybody, and it became a universal sport. And then came the time when the head of a business met his clerks and his stenographers on the side paths and at bicycle inns on even terms; where the society lady met the lady's maid out with her fiancé on the cycle paths and at the bicycle inn, and those people who did not care to meet socially were thrown together. And then came the time when those who desired to be exclusive became dissatisfied with bicycling as a sport and withdrew from it. And first in England and afterwards in this country and elsewhere, bicycling ceased to be a popular sport of society.

"Then the middle class, which always follows the lead of the others, however much it may deny it, also ceased bicycling. Ladies are no longer seen on bicycles, the prominent men of industry and the owners of factories and older people who desire

to keep some of their dignity are not riding the bicycle any more across the country. The country roads for bicycling are standing idle, and bicycling has ceased to be a sport. But there are probably more bicycles now in existence than ever before. The bicycle is now a business convenience, it is now a convenient means to go to and return from work. In short, it has come to stay, but no more as before, where any conversation between any class of men or women within a few minutes all was turned into discussion of bicycling, the question of single tube as against double tube, chain as against the gear; all that has ceased, and the bicycle is a bicycle just as a carriage is a carriage. It is merely a convenience and a commodity, and as such it has found a permanent place in modern life; a very useful one, but it is not a sport any more.

"This has been the history of every popular sport which has any social utility. This you see now taking place before your eyes with the automobile. The automobile has been and is still the popular sport of the exclusive; but in the last years by mass productions cheap and reliable automobiles have come on the market, and the automobile now has become available to the more prosperous middle class. And now we see on our automobile roads not only society people, or very well-to-do people, but we also see people of moderate means, and we see them in increasing numbers. That means that now, in the last year and this year, the prominent man and the society lady meet at the automobile rest house on the automobile road; the man meets his foreman and his mechanics in their automobiles there, and the lady meets maid-servants and others of that class; and that means the exclusiveness of automobiling and all pertaining thereto has ceased today. And when you look around you will find this year already there is an appreciable falling off in long distance touring by automobile by the very well-to-do exclusive set.

Automobiling for Sport Decreasing

"This is the beginning of the end of automobiling as a popular sport. You will see it more marked still during the next year. It will undoubtedly take well for some years, while the automobile will be frequently met on the highways between cities and on long distance tours when those people of moderate means to whom the automobile has just become available enjoy the automobile as sport. But it will not stay at that, for we must realize that when the glamour of the sport begins to vanish; as they have realized that it is hard work to drive a bicycle, that it is not a pleasure to take care of it and tone up the chain, etc., they will all realize that maintaining and taking care of an automobile and its engine is not a pleasure. As soon as it ceases to be the desirable sport of all those who desire to amount to anything, they will then realize it is hard work to propel a high powered machine over country roads. When that time comes, then the automobile will find its sphere—not as an appliance of sport, but as a useful commodity, a business and pleasure vehicle.

"But with the chain of which you now begin to see the beginning, that naturally will materially affect the character and the structure of the automobile.

"In the bicycle, while there are probably more bicycles in use today than ever before, the average riding distance is very greatly decreased. There are very few people any more who care to ride 100 miles a day or so, and the average distance where they are used continuously as for purposes of business is much less. It is now a useful means of propulsion; no longer a sport.

"You will see the same with automobiles, that long-distance cross country riding will decrease as soon as the automobile ceases to be a sport, but it will become much more than now, a utility.

"To illustrate and discuss the changes which of necessity will occur then, we must look over the technical development of the automobile. The first attempts were made in three different directions: By the steam engine as motor propulsion; in the gasoline-driven automobile, and in the electric automobile. The steam engine soon dropped out of competition. It is too much of an engine to get the best efficiency and economy in which it was superior to the gas engine. It required more engineering than the average owner and operator of an automobile is willing and capable to bring to the operation of his car; so the steam car went out of the competition.

Electric—A Practical Vehicle

"The electric car, although it soon had to drop out as motor propulsion of the sport automobile, because in cross country riding with the automobile, as sport in touring, the two main considerations where high speed and long distance of operation are concerned, are the same two which dominated in the day of the bicycle. The electric car was hopelessly outclassed in both of these directions, and therefore had to withdraw from the competition. It did not disappear, but found a field of its own, a field of providing a convenient, safe and reliable vehicle for business and pleasure purposes for those who did not use the automobile as sport and for touring across the country, but who kept it for town use, as a business and pleasure vehicle. Indeed, those uses in my opinion will be the permanent applications of the automobile after the period of sport has passed.

"But even in this field the electric car has been very seriously handicapped when compared with the gasoline car, because even there the automobile is sport for the purpose of going to work, for the purpose of the physician in making his round of visits, for the purpose of the electric central station in providing its employees with means to get around quickly. There is always this idea in the mind of the owner or employe or user of an automobile, that on holidays and Sundays he would like to use the automobile for sporting purposes, for touring purposes, and therefore he prefers the gasoline car with its wider radius; even though it is less convenient, it can get to and from work and do legitimate business better. But this limitation does exist, and will continue to exist only so long as touring cross-country in automobiles remains a popular sport.

"We have gotten out to where the situation changes, and in the sub-period the requirements of the automobile will be, not high speed, because very high speed is of no use in the interior of a city or in the suburbs where traffic conditions limit the speed of what would 10 years ago have been considered excessive speed, but which we now consider moderate speed, namely, 15 to 20 miles an hour. Furthermore, there is no further advantage of high speed in service, because where the car is used to go to and from work, it is generally over a distance of say from 1 to 3 miles, and this at the speed of 20 miles per hour, the time consumed is from 2 to 3 minutes up to 10 minutes. That time is so short that a minute or 2 saved would not be considered an advantage, since the time of getting ready is comparable with the time of taking the car out and putting it away at destination.

"When you come to the care of the physician's car, the distance between patient and patient is rarely more than a mile, and that is 2 or 3 minutes of time. And this 2 or 3 minutes on the road between patients is negligible as compared with the time of seeing the patients. So, no saving can be effected with the higher speed; and the higher speed means a greater disadvantage of strain in running the car. So the matter of high speed is dropping now into secondary consideration with the automobile in which legitimate business and social use is the main factor.

"Furthermore, the mileage which can be made by the car is less, for even a busy physician in a day probably averages not more than 10 or 20 miles, rarely more than 20 miles, though a mileage of 30 miles on one charge would probably satisfy the requirement of 90 per cent. of all users. That means the two characteristics which gave the gasoline car the dominance—high speed and high mileage ceased to be of importance when the automobile dropped from a sporting appliance to a business commodity.

"But, essentially then, you come to the ease and the simplicity of operation, and the fact that everybody can handle a car, so at the best a gasoline car, however simple it is from the view of the automobile enthusiasts, we must realize that it means control of the ignition, control of the gear change, and control of the clutch—three controls in addition to the steering. Now that is too much for the average man who is not an engineer to submit to, except when under the stimulus of the enthusiasm of a popular sport, and that is the disadvantage of the steam car; and there I believe the advantage is very decidedly with the electric, which has simply the starting and stopping, in addition to the steering gear. Then there is the question of reliability. The gasoline car requires to be taken care of. At present it is a sport. It is a recreation for the owner of the automobile that he can spend his holiday or part of it, in playing with the engine and fixing and tuning it up, but if it were not a favorite sport, but merely the necessity of taking care of an engine belonging to a vehicle, then it would look very different.

Electric Needs Little Attention

"As we saw in the case of the bicycle, the bicycle requires very little attention. Still the users of bicycles consider that it is a nuisance and an inconvenience to have to take care of it. So it means in a vehicle for business that we must have as much reliability as requires no attention. Here again the advantage is with the electric. And so with these conditions, where the automobile is ceasing to be the favorite popular sport, and settles into its permanent field as a most useful, a most satisfactory, a most generally-used pleasure and business vehicle, the advantage will be most decidedly with the electric. And the gasoline car will practically disappear from this field.

"There will remain a legitimate field for the large high-power gasoline car to travel across the country to such places where the Pullman car on the railroad track does not go. To take care of transportation to places not reached by railroads. Then it will be the car owned by people very well-to-do who can afford it, in charge of a skilled, competent mechanic, who takes care of the car and drives it; but not the vehicle operated by the owner.

"So you see, in my opinion, the future of the business and pleasure vehicle undoubtedly belongs to the electric.

"Now the characteristics which the electric car must have necessarily must differ from those of the present electric car. That is due to the limitation of its field

by the dominance of the gasoline car, enforced by automobiling as a dominant sport.

"*Moderate speed—a maximum of say 20 miles an hour, and moderate radius, possibly say 30 miles, which will be practically sufficient for the day—recharging at night. This means a light battery, a correspondingly light structure, and a correspondingly light motor. It means a vehicle whose weight, inclusive of battery, is probably materially less than 1,000 pounds. It means a fitting up, not luxurious as the present electric, but plain and simple, of the same character as the present low-priced gasoline car, which is rapidly occupying the market. It means then a price not exceeding $500.*

"Now, with such an electric vehicle I believe there will be very little chance in the days of the decadent sport of automobiling for the gasoline car to compete. *And I have no doubt that in 10 years, more or less—rather less than more—we will see the field of the pleasure and business vehicle covered by such an electric car in large numbers. And I believe I underestimate when I say that 1,000,000 or more will be used.*

$75,000,000 for Central Stations

"But now coming to our side here, the electric central station, what would that mean to the station?—1,000,000 electric vehicles to be taken care of and supplied with power. Estimating 10 kilowatt-hours per charge; estimating that they are recharged every night, but in the average only one-half a charge, because I do not believe the average use is more than one-half the maximum radius. Then with 1,000,000 such electric cars it would mean about 1,500,000,000 kilowatt-hours a year, or, at the 5-cent rate, $75,000,000 of business; and that is a business of an excellent load factor, a steady load from 6 to 8 hours.

"More than that, it is a load where the time of power consumption can, with very little difficulty, be chosen by the station. That is, all that power demand can be placed into the off-peak period, into the night period, and it would mean an additional load on the central stations of the country of 1,500,000,000 kilowatt-hours without any practical additional investment, except charging sets. So that you see that, in my opinion, is a most profitable business which the future has in store for the central station.

Electric Automobile Will Supplant Trolley

"Now, then, that estimate is based only on the pleasure and business vehicles to go to business with, to open up those suburban territories, not on the lines of the trolley cars and therefore preoccupied by the working population, but outside of the territory reached by the trolley, and which are being occupied today increasingly by the better paid middle class who can afford an automobile to go to the city and to work.

"Outside of this, and in addition thereto, is the power demand of the electrical truck, the delivery wagon, from the heavy truck to the light electric tricycle, which is an enormous field which can be covered where already today the electric car successfully competes with the gasoline car because the limited radius and the moderate speed fit it to the nature of the delivery business or for the heavy trucking. *Now that will naturally become entirely the field of the electric car, due to lesser maintenance charge and simpler control.* And in addition to those 1,500,000,000 kilowatt-hours it is probably another equal amount.

"Now, how can this business be taken up by the central stations? One way would be to let the garage take care of the automobile charging. That I believe would be extremely undesirable, first, because it would delay development due to the inherent antagonism of the garage against the electric vehicle. Inherent, because a large part of the income of the garage is naturally and usually from repairs and supplies; and both are practically eliminated by the electric car. Furthermore, as central station men, we have to realize that the location of this power in the off-peak period is not feasible, or is much more difficult if the charging is done by a private garage, and not under the control of the central station, although with the increasing demand for electric power for charging we must realize that here if the private garages are left to take care of it the central station will meet again the competition of the isolated plant under conditions much more formidable than they met in the business building, because where the demand for power for automobile charging will be sufficiently large for the garage to install its own isolated plant, the main and most formidable objection to the isolated plant, namely, that it requires skilled attention, and that the average janitor cannot properly operate it, and therefore it is uneconomical and unsatisfactory, now this objection will not exist, because the men met in the garages are those trained in the care of gasoline engines, and they are the best class of attendants to take care of isolated plants. So, to avoid again the competition of the isolated plant under this more severe condition than heretofore met, the central station must in the beginning take hold of this new business, and control it from the beginning, by making provision for taking care of this work for charging electric automobiles.

"Now, there are various ways proposed. One is the fixed batteries, the central station exchanging the exhausted battery to the electric car against the newly charged battery. This is being done in the restricted territory with a restricted number of automobiles, especially automobile trucks.

"Again, I do not think that is feasible where you have to meet all kinds of batteries, and in all states of perfection or dilapidation. The most promising method then appears to me to be the taking care of electrical maintenance of the automobile by the central station at a fixed monthly charge, say from $5 to $20 a month, whereby the automobile owner runs his car into the garage of the central station in the evening, and over night the charge is being made, or the charge completed, if it is still partly charged, and next morning the machine goes out freshly charged.

"That appears to me in many respects the most promising plan. First, the average owner as a rule, over-estimates the power consumption. We realize when we have a 5-horsepower motor, running for 10 hours, that the power consumed is not 50 horsepower-hours, it is very much less, and we do not realize that a motor on an average does not carry its rated load except in rare instances, so that where the central station takes care of the charging of the automobile at a fixed rate, the experience will be that it will not be required to completely charge over night, but probably the average may be less than half charged.

"Now, you see, assuming they charge every night during the month, this would mean, at the 5-cent rate, $7.50 a month for the charging. On the basis of $2.50, as an average, as interest on the storage shed, I believe it would be a very economical proposition to the central station to undertake the storage and charge the private electric automobile owner at the rate of something like $10 a month for both the storage space and the charging.

"This could be further extended by taking care of the vehicle, cleaning it, and on call sending it to the owner by a messenger boy and bringing it back in the evening, and similar service, and the minor repairs could well be turned over to a friendly garage, thus securing the co-operation of the existing garages in such a comprehensive plan of taking care of the power and the service demanded by the ordinary electric vehicle.

"You realize what that means. A $10-a-month charge for the entire care of the automobile would make the electric automobile a reasonably cheap car, available to an enormous number of people, who can afford to buy an automobile but cannot afford to have a garage to keep it in, nor would they care to take care of it themselves, so that in itself would greatly extend the use of the electric automobile, but it would not help the gasoline car, as the latter is handicapped by requiring engineering supervisions, attendance, which is not necessary with the electric vehicle.

"As regards the central station, you realize that while the average income from charging at such a rate of $10, assuming half charge every evening, would amount to 5 cents a kilowatt-hour probably in the average, the charge required per night is even somewhat less, and the rate for power received from the customer in the average probably will exceed 5 cents per kilowatt-hour than be below that amount, and still the charge to the customer would be lower than the amount for which a physician could keep a horse, or any man keep a gasoline car, or take care of it in any way, so that it would be a very profitable arrangement for both interests concerned.

No Extra Equipment Needed

"Now, the average central station, for off-peak power, would require no additional investment beyond the charging set, which is very moderate, and the average cost of such power certainly should be, if anything, less than one cent per kilowatt-hour. At the average selling price, figuring at 5 cents or more, you see in this plan $75,000,000 worth of additional business; or rather, $60,000,000 would be available as additional central station profit, so that I believe it is well worth while for the central station to give that matter careful consideration. Put your house in order and keep in view the getting control of this business while it is still in the very beginning.

"What I particularly wanted to draw attention to is to look at this matter broadly—the automobile starting as a sporting craze, which is now following the laws of all sports, the temporary enthusiasm over the automobile as a new means of propulsion has passed, and it is now assuming a permanent form in the means of locomotion available to the public, it is now beginning to approach that transition period of the spirit of sport and the spirit of straight business in the matter of the use of motor cars—the pendulum has swung again in favor of the electric automobile, while it swung in favor of the gasoline automobile during the sporting period. When it swings in favor of the electric car it is up to us to get the benefit from it. There is an enormous business, a profitable business, for the central station which is at hand, if you will take hold of it, but we must look after it from the very beginning or else it will slip out of our hands, retard the progress of the industry and benefit nobody."

Factory Miscellany

THOMAS to Use Columbus Buggy Plant—The new owners of the Columbus Buggy Co., Columbus, O., Charles A. Finnegan and Eugene D. Hofeller of Buffalo, who took over the Columbus plant several weeks ago, are operating the concern with a small force of workmen. For the time being the output of the concern will consist of both electric and gasoline automobiles as well as horse-drawn vehicles. The announcement has been made by the new owners that the plant of the E. R. Thomas Co., Buffalo, owned by the same interests will be removed to Columbus and both the Thomas and the Columbus-Firestone cars will be made at the Columbus plant. Just when this will be done is not stated.

Standard Aluminum Adds—The Standard Aluminum Co., of Two Rivers, Wis., is installing another large annealing oven so that its capacity may be increased to accommodate the largest volume of business it has ever experienced. Recently a rolling mill was erected.

Federal Extension Work Resumed—Extension work on the factories of the Federal Rubber Manufacturing Co., in Cudahy, Wis., has been resumed. At present it is reported that 1,200 men are employed in the plant, while 3 years ago only thirty workmen were employed.

Buckeye's New Plant—The Buckeye Machine Co., manufacturer of gas engines, owned by Edward Neiswander, C. P. Neiswander and J. A. Neiswander, will locate a new factory in South Lima, O. The site consists of 3 acres lying between Atlantic avenue and Broadway, south of the C. & E. tracks. The main building will be of brick.

Dunk Purchases Dayton Assets—All the assets, consisting of the patterns, tools, service parts and other property formerly owned by the Reliable Dayton Auto Co., of Chicago, have been purchased by A. O. Dunk, president of the Puritan Machine Co., of Detroit, and the entire stock has been moved to the warehouses of the Puritan company, in Detroit.

Mack Factory Branch in Los Angeles—J. A. Stoner and W. M. Thompson, of the Mack Truck Co., have decided to build a factory branch in Los Angeles, Cal., which will be completed within the next 3 months. The plant will employ 300 workmen and will supply trucks for the entire territory west of the Rocky Mountains, also British Columbia, Hawaii and the Orient.

Santo Plant at Niagara Falls.—The Pittsburgh Santo Rubber Co., Oliver Building, has secured a site at Niagara Falls, N. Y., on which it will erect a new factory to cost about $60,000. Architect D. A. Crone, Oliver Building, has prepared plans for a one-story building 90 by 260 feet to be used for factory purposes and a two-story administrative building 50 by 50 feet. The company will manufacture automobile tires and other rubber goods.

May Establish Plant in Green Bay—J. A. Fletcher, of Chicago, inventor of a new metal alloy adapted particularly for use in cutlery, motor car and engine parts, etc., is negotiating with local capital with a view to establishing a plant in Green Bay, Wis. Mr. Fletcher made a canvass last summer, but dropped the project before its completion. The material is a substitute for brass and has economy and greater strength to recommend it over brass and bronze alloys.

Manufacture Thirty-five Jefferys a Day—Thirty-five cars per day, or a total of more than 900 for the month, was the record of the Jeffery factory during the 25 working days of May. New men are being added to the Jeffery force every day, although the working time is now 13 hours and the schedule for June is 1200 cars. About 25 per cent. of the Jeffery output is the $2,250 Sixes, and the remainder is the $1,550 light Four, in which is embodied a high-speed, high-efficiency European motor.

Panama Plant's Valuation Increased $50,000—A $50,000 asset has been added by nature to the valuation of the plant of the Panama Rubber Co., Compton, Cal. This tire company bought in an artesian well that supplies 81 miners' inches of water through a 12-inch pipe. The pressure will throw a 6-inch stream 100 feet high. Considerable water is used in the manufacture of tires, and therefore this well will be worth thousands of dollars annually. The W. D. Newerf Rubber Co., Los Angeles, will distribute the entire product of the Panama tire factory. Walter Sahland is now in the Imperial Valley placing agencies.

Factory to Be Enlarged—W. B. Jameson, superintendent of the Newcastle, Ind., plant of the Maxwell Manufacturing Co., today announced that improvements are to be commenced at once, at the local factory. These improvements consist of the installation of new mechanical equipment costing $120,000 and an additional 60 by 100 feet. Three hundred and fifty more men will be added to the payroll. It is proposed to have the new machinery installed and additions built by August 1. This property was acquired by Walter E. Flanders, of Detroit, and his associates, over a year ago, and is devoted to the manufacture of automobile parts and repairs.

Cyclecar Co.'s Plant Not in DePere—It is now practically certain that the Milwaukee Cyclecar Co., Milwaukee, Wis., will not establish its proposed cyclecar plant in DePere, Wis., the local advancement association having found itself unable to meet the conditions of the proposition that $25.000 be subscribed to the capital stock of the Milwaukee concern. Only $15,000 has been raised thus far and the time limit is passed. A suitable building had been provided and several local capitalists subscribed $5,000 each. The condition of the money market at this time is said to be the reason of the failure of the promoters to procure further subscriptions. The cities of Oconto and Superior, Wis., have opened negotiations with the company.

The Automobile Calendar

June 12-13.....Chicago, Ill., Seventh Annual Reliability Run to Peoria and return; Chicago A. A. and Chicago A. C.
June 15.....Savannah, Ga., Run, Savannah Auto Club.
June 17-18.....Fayette Co., Pa., Second Annual Hill Climb, National Pike.
June 18.....Uniontown, Pa., Hill Climb, Auto Club of Fayette Co.
June 20.....Milwaukee, Wis., Competition Run between Milwaukee Athletic Club and Milwaukee Automobile Club.
June 23-26.....S. A. E. Summer Meeting, Cape May, N. J., Cape May Hotel.
June 24 .....Syracuse, N. Y., Annual Club Run, Automobile Club of Syracuse.
June 24-26.....Chicago, Ill., Seventh Annual Meeting of Nat. Gas Engine Assn.
June 27-July 4....A. A. A. Touring Week.
June 27.....Brooklands Track, England; Annual Automobile Race.
June 30.....London, Eng., Fourth International Rubber and Allied Industries Congress.
July 3-4.....Tacoma, Wash., Montamara Festo Races, Tacoma Speedway Assn.
July 4.....Prescott, Ariz., Road Race, Prescott Auto Club.
July 4.....Sioux City, Iowa, 300-Mile Race, Sioux City Auto Club and Speedway Assn.
July 4.....Lyons, France, French Grand Prix.
July 13-14.....Seattle, Wash., Track Races, Seattle Speedway Assn.
July 25-26.....Belgium Grand Prix Road Races.
Aug. 21-22.....Chicago, Ill., Elgin Road Races, Chicago Automobile Club.
Aug. 23.....Auvergne, France, Coupe de l'Auto Race.
Aug. 27.....Brooklands Track, England; Annual Automobile Race.
Sept. 9.....Corona, Cal., Road Race, Corona Auto Assn.
Sept. 26.....Brooklands Track, England, Annual Automobile Race.
Sept. 26-Oct. 6....Berlin, Germany, Automobile Show.
Oct.....Philadelphia, Pa., E. V. A. A. Annual Convention.
Oct. 9-Nov. 2.....S. A. E. European Trip.
Oct. 16-26.....Paris, France, Automobile Salon.
Oct. 17-24.....Pittsburgh, Pa., Automobile Show, Auto Dealers Assn., Inc.
Oct. 19, 20, 21.....Philadelphia, Pa., Elec. Veh. Assn.'s Convention.
Oct. 19-26.....Atlanta, Ga., American Road Congress of the American Highway Assn. and the A. A. A.
Nov. 6-14.....London, England; Olympia Show.

The Week in the Industry

Motor Men in New Roles

SCHWARZKOPF with Gray & Davis—E. E. Schwarzkopf has been appointed special representative of Gray & Davis, manufacturer of starting and lighting equipments. For the past year Mr. Schwarzkopf has been connected with the organization and management of the Manhattan Automobile Club, New York City.

Appointed Chief Factory Inspector—Joseph Gardham, who has been with the Hudson Motor Co., Detroit, Mich., for some time in various capacities, has been appointed its chief factory inspector.

Chase Joins Abbott—J. M. Chase has been appointed manager of advertising and sales promotion by the Abbott M. C. Co., Detroit, Mich. He was formerly in a similar capacity with the Regal M. C. Co., Detroit.

Frost Oakland Service Manager—A. H. Frost, during three years service manager of the Standard Auto Co., Detroit, has been appointed service manager of the Detroit branch of the Oakland Motor Car Co.

Prof. Bradley with U. S. Tire—Professor Walter Parke Bradley, for 25 years professor of chemistry at Wesleyan University, in Middletown, Conn., has resigned to enter the service of the United States Tire Co.

Jewett with Jiffy Curtain—N. H. Jewett is now sales representative of the Jiffy Auto Curtain Co., succeeding Harry Kane. He will make his headquarters with the Jiffy Auto Curtain Co. in the Dodge Power Building, Detroit, Mich.

Invents Motor Plow—H. S. Carpenter, of East Fremont street, Fostoria, Ohio, is the inventor of a motor plow which is being tested at Fostoria, Ohio. The motor is that of an used automobile. Two large wheels are placed in front and two smaller wheels in the rear.

Johnson Klaxon's Detroit Representative—The Lovell-McConnell Mfg. Co., maker of the Klaxon horn, has appointed Charles Johnson as special representative of the company with permanent headquarters in Detroit. Mr. Johnson represented the concern in their successful campaign for sane warning signal legislation.

Barnes in New Capacity—The Lee Tire & Rubber Co., Conshohocken, Pa., with headquarters at 334 North Broad street, has appointed W. R. Barnes, recently head of the Goodyear Tire Co. there, chief of the Philadelphia district, comprising Pennsylvania, Southern New Jersey, Delaware and Maryland.

Rice Resumes Atwater-Kent Duties—After more than a year's absence, during part of which he was actively engaged in marketing a new accessory and the balance in studying Western sales conditions, H. E. Rice has resumed his duties with the Atwater-Kent Mfg. Co., Philadelphia, Pa., of which he is now manager of sales and advertising.

Strong Buick's Chicago Manager—E. T. Strong, for two years manager of the Indianapolis, Ind., branch of the Buick Motor Co., has been advanced to manager of the company's branch at Chicago. James E. Trotter, who has been assistant manager of the Chicago branch, has become manager of the Indianapolis branch.

Baker Joins Advertising Agency—C. J. Baker, until recently publicity manager of the Maxwell Motor Co., Detroit, has become identified with the Dunlap-Ward Advertising Agency, Detroit. Mr. Baker is well known in automobile publicity circles, having been associated with the staffs of the Brush and Lozier companies before joining the Maxwell company.

French Resigns from Cyclecar Co.—L. E. French, the designer of the Los Angeles Cycle Car Co., Los Angeles, Cal., who has spent the last six months in Buffalo, N. Y., in preparing to manufacture cars, has recently returned to the Pacific Coast. After submitting a report to the board of directors of the work accomplished at Buffalo, he tendered his resignation as president of the company.

Pomeroy U. S. L. Manager—L. R. Pomeroy, a railway and electrical engineer of prominence, has been appointed manager of the New York sales office, 16-24 West Sixty-first street, of The U. S. Light & Heating Co., the general offices of which are now at Niagara Falls, N. Y. Mr. Pomeroy has under his direction the sales of the U-S-L Axle electric car lighting equipment, electric starter and lighter and storage batteries in the territory of the New York branch office.

Hallowell Mitchell Wagon Manager—J. D. Hallowell, formerly manager of the Moline Wagon Co., Moline, Ill., and the Winona Wagon Co., Winona, Minn., and also associated with the John Deere and Velie interests at Moline, has been appointed general manager of the Mitchell Wagon Co., a $500,000 corporation organized recently by the purchasers of the wagon department of the Mitchell-Lewis Motor Co., Racine, Wis. The wagon works, which also build motor car bodies, are now entirely distinct from the Mitchell-Lewis motor car works.

Redden To Go to Europe—General Sales Manager C. F. Redden, of the Maxwell Motor Co., Inc., Detroit, Mich., has booked passage for Europe and will sail from New York on June 18 for Liverpool. After spending several days in that city he will go to London and carefully analyze the automobile situation in Great Britain. A number of Maxwell district managers and district supervisors will be appointed, after which Mr. Redden will successively visit France, Germany, Italy and Russia. In each of these countries he will make an exhaustive study of the automobile situation, appointing, as in England, district managers and supervisors.

Garlent Hupmobile General Manager—H. E. Garlent has been appointed general superintendent of the Hupp M. C. Co., Detroit. Mr. Garlent, who is Canadian by birth, made his apprenticeship as machinist with the Kerr-Goodwin Co., Branford, Canada, and worked himself to the position of chief tool designer with that concern. In 1906 he became chief factory inspector of the Brush concern in Detroit. Later he took a similar position with the Lion M. C. Co. When this plant was destroyed by fire Mr. Garlent was offered the position of superintendent at the Oakland M. C. Co., which he has been holding for the last 18 months until his acceptation of the Hupp company's offer.

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Garage and Dealers' Field

Buys Buick Branch—F. W. A. Vesper, until recently assistant general sales manager of the Buick Motor Co., of Flint, Mich., has purchased the Buick branch house property and business in St. Louis, Mo., and is now taking care of the Buick business.

Detroit Agency Moves—The Star Tribune Co., formerly at 815 Woodward avenue, Detroit, Mich., now occupies the garage and salesrooms located on East Grand Boulevard, Detroit, which was formerly occupied by the Wahl Motor Car Co. The Star company will handle the O. K. trucks, made by the Paterson Motor Co., Flint, Mich.

Twenty-Five De Dions Added—The Fifth Avenue Coach Co., New York City, placed an order with the De Dion Bouton selling branch for twenty-five omnibus chassis, to be delivered in August. This order, with the twenty-five new omnibuses which the company has put in operation early this spring means an addition of fifty more De Dion Bouton omnibuses to the equipment of the Fifth Avenue Coach Co. in less than a year.

Smalley Daniels Moves—Smalley Daniels, the veteran manufacturers' sales representative, has moved his main office in Detroit, Mich., to 870 Woodward avenue in the Edwin George Building, from 803 Woodward avenue, owing to the closing of the branch of the Hartford Suspension Co., with whom he had offices. S. L. Jackson has become office manager for Smalley Daniels, manufacturers' sales representative, main office, Detroit. Mr. Jackson resigned from the sales management of the Detroit Boat Co. and was formerly identified with the Motsinger Device Mfg. Co.

Empire Trans-Continental Car Returns—With a record of 19,000 miles to its credit, Empire car No. 19, which had the distinction of being the smallest car to participate in the Indiana-Pacific tour last summer, last week returned to Indianapolis. This Empire is one of the few cars participating in the trans-continental tour to return to Indianapolis. After driver Joe Moore had taken the car across the country it was placed at the disposal of Pacific Coast distributors as the show car, has been constantly on the go, adding thousands of California, Washington and Oregon miles to its record, its itinerary taking in all sections of these coast states. Mechanically and in outward appearance the car is in splendid condition, showing no ill effects from the strenuous career it has had.

Automobile Agencies Recently Established

PASSENGER CARS

Place	Car	Agent
Alexandria, O.	Empire	S. S. Anderson
Alexandria, La.	Oldsmobile	W. Lennie-Smith
Amityville, L. I.	King	E. S. Van Nostrand
Athol, Mass.	King	J. Edward Barrus
Ayden, N. C.	Maxwell	T. E. Cannon
Beaver Falls, Pa.	Moon	Beaver Falls Motor Co.
Belleplaine, Minn.	Maxwell	Jos. Neubeiser
Benedict, Kan.	King	F. S. Benedict
Benton Harbor, Mich.	King	W. S. Robinson
Berryville, Ark.	Maxwell	R. E. Morris
Beverly, Mass.	King	Geo. S. Snelling
Birmington, Mich.	King	James E. Valentine
Baltimore, Md.	King	Shaffer Mfg. Co.
Boston, Mass.	Duryea	J. M. Barry
Boston, Mass.	Vulcan	Reed-Atherton
Bridgeport, Conn.	King	Emil L. Scherer
Bridgehampton, L. I.	King	Leslie C. Hallock
Brockton, Mass.	King	Merton L. S. McCrillis
Brookfield, Mo.	King	A. C. Carpenter
Brooklyn, N. Y.	King	Cumberland Garage
Brown City, Mich.	Maxwell	C. J. Buck
Brownsville, Tenn.	Maxwell	F. B. Voltermann
Burlington, Vt.	Maxwell	Henry Todd
Camden, Me.	King	Guy Ware
Canton, O.	Saxon	Al. Shem
Cape Elizabeth, Me.	King	Cape Shore Garage
Chatfield, Minn.	Maxwell	J. B. Ellis
Chester, S. C.	Maxwell	R. R. Hafner
Chicago Junc., O.	Overland	J. H. Seigle
Cleveland, O.	King	Dunham Motor Co.
Cleveland, O.	Moon	Sixth City Motor Co.
Columbus, O.	Detroiter	F. P. Corbett
Columbus, O.	Studebaker	Tesseyman Auto Co.
Crestwood, N. Y.	King	A. S. Sargent
Cullman, Ala.	King	John F. Sutterrer
Danbury, Conn.	King	A. C. Penny
Dayton, O.	Haynes	Powers & Summersett
Delta, O.	King	Blaine & Fraker
Denver, Mo.	King	Bram Bros.
Derry, N. H.	King	Joseph W. Dinsmore
Detroit, Mich.	Haynes	F. Hill & Co.
Dewey, Okla.	King	Pope Garage Co.
East Hampton, L. I.	King	L. Y. Halsey
East Harwich, Mass.	King	Walter Emery
Elkader, Iowa.	Franklin	Dr. W. A. Miller
Elmhurst, L. I.	King	J. H. Walsh
Elmont, L. I.	King	Hoeffner Bros.
Enosbury Falls, Vt.	King	E. A. Beatty
Epping, N. H.	King	Frank L. Pollard
Evanston, Wyo.	Maxwell	J. L. Wicks
Eversonville, Mo.	King	S. E. Cook
Fayette, Mo.	King	Ballew & Kivett
Fitchburg, Mass.	King	Fitchburg Hardware Co.
Freeport, L. I.	King	Thos. Forbes, Jr.
Fremont, O.	King	Hilt & Keating
Galion, O.	Reo	Joseph E. Berger & Son
Gardner, Kan.	King	Dunn & Anderson
Goldboro, N. C.	Haynes	Ford Garage Co.
Goodrich, N. D.	Maxwell	Billigmeier Merc. Co.
Gradyville, Ga.	King	Dr. W. H. Byran
Grand Forks, N. D.	Maxwell	Hanson Bros. Auto Co.
Grand Rapids, Mich.	King	L. Phelps
Grand Saline, Tex.	Maxwell	H. P. Beard
Hickory, Pa.	Moon	Ross Motor Car Co.
Holyoke, Mass.	Maxwell	Laduke Auto Exchange
Honesdale, Pa.	Maxwell	E. W. Gammell
Hopkinsville, Ky.	Maxwell	Forbes Mfg. Co.
Idaho Falls, Idaho.	Haynes	Clay Automobile Co.
Independence, Kan.	King	Chaney & Passauer
Ione, Cal.	Maxwell	E. G. Woolsey and C. T. Gowett
Keene, H. H.	King	George H. Eames & Son
Kokomo, Ind.	King	George Mfg. Co.
Jamesport, L. I.	King	Fred B. Hallock
Jefferson, Iowa.	Maxwell	W. R. Adrian
Joplin, Mo.	King	Thos. H. Stults
Kingsburg, Cal.	Maxwell	Robert Gustafson
Kiowa, Kan.	King	G. V. Wilson
Lake Charles, La.	Maxwell	A. M. Miller
Lake Orion, Mich.	King	G. W. Bannister
Lestershire, N. Y.	King	Chas. Wakeman
Lexington, Mo.	Moon	E. F. Cox
Lisbon, N. D.	Maxwell	J. G. Hyde
Lockport, N. Y.	King	A. L. Hoag
Lorain, O.	Overland	G. W. Williams
Louisville, Ky.	Oldsmobile	Kentucky Motor Car Co.
Louisville, Ky.	Pathfinder	Pathfinder Motor Car Co
Loveland, Col.	Maxwell	L. K. Alsbury
Lowell, Mass.	King	A. P. Sackley
Lynchburg, Va.	Maxwell	Wm. Carter
Malta Bend, Mo.	King	Cole Bros.
Manchester, N. H.	King	O. L. Hazelton
Manchester, Ga.	Maxwell	Davis & Crawley
Marietta, O.	Franklin	Anderson Bros.
Matamoras, Pa.	King	Lester Pitney
Maxwell, Iowa.	Maxwell	Neil Auto Co.
Medina, N. Y.	King	E. B. Simonds
Melrose, Mass.	King	F. H. Goss
Mendon, O.	King	E. J. Drake
Mineola, L. I.	King	Wm. Simonson
Mineola, Tex.	Maxwell	C. M. Dozier
Moberly, Mo.	King	C. L. Leitch
Monessen, Pa.	Moon	Monessen Plbg. & El. Co.
Monticello, Ga.	Maxwell	J. E. Hecht
Montrose, Va.	Maxwell	Montrose Motor Co.
Mt. Pleasant, Mich.	King	A. Z. Campbell
Newark, N. J.	Wescott	Van Deman & Wainwright
New Brunswick, N. J.	King	Harvey J. Moynihan
New Haven, Conn.	King	W. R. Moore
New York, N. Y.	Wescott	C. B. Derby & Co.
Northwood, N. D.	Maxwell	Thorsgard & Olson
Norway Lake, Minn.	Maxwell	B. Halvorson
Oklahoma City, Okl.	Franklin	John W. Lee
Oley, Pa.	King	Oley Motor Co.
Orchard Hill, Ga.	Maxwell	Oscar Atkinson
Oshkosh, Wis.	Maxwell	A. E. Hamley
Oswego, Kan.	King	J. F. Dean
Oxford, Mass.	King	E. A. Wheelock
Palestine, Ill.	Maxwell	G. B. Mullen
Palmyra, N. Y.	Maxwell	Albert B. Reynolds
Paterson, N. J.	King	James C. Guld
Perkasie, Pa.	Maxwell	J. Samuel Bowen
Pinconning, Mich.	King	Laurence & Naumes
Pittsburgh, Pa.	Wescott	Pittsburg Motor Sales Co.

Recent Incorporations in the Automobile Field

AUTOMOBILES AND PARTS

BINGHAMTON, N. Y.—Binghamton Automobile & Supply Corp.; capital, $110,000; automobiles. Incorporators: F. E. Spawn, C. J. Phillips, D. C. Herrick.

BOSTON, MASS.—Cadillac Automobile Co.; capital, $100,000; automobiles. Incorporators: A. L. Danforth, B. K. Danforth, J. J. McGregory.

BOUND BROOK, N. J.—Sloane Daniel Motor Co.; capital, $25,000; automobiles. Incorporators: C. Hogue, W. Phillips, J. E. Sloane.

BUFFALO, N. Y.—Pat Toal; capital, $5,000; automobiles. Incorporators: P. A. Toal, D. M. Hepburn, P. P. Barton.

CHARLESTON, S. C.—Motor Transport Co.; capital, $2,000; automobiles. Incorporators: M. S. Pundt, C. K. Williams.

CINCINNATI, O.—Hunter-Dammel M. C. Co.; capital, $5,000; automobiles. Incorporators: J. H. Hunter, A. W. Dammel, Hulda Koppitke, J. L. Meyer, L. H. Nathan.

COLUMBUS, O.—Dunlap Electric Truck Co.; capital, $20,000; to deal in electric motor trucks. Incorporators: G. H. Hedges, S. A. Hoover, H. R. Tingley, M. E. Heasley.

EAST LIVERPOOL, O.—Liverpool M. C. Co.; capital, $10,000; automobiles. Incorporators: C. R. Larkin, S. J. Norton, H. A. McClain, M. Camards, A. G. Ellis.

FORT SMITH, ARK.—Winslow Automobile Co.; capital, $15,000; automobiles and repair work. Incorporators: L. F. Brock, R. N. Winslow, S. L. Williams.

KNOXVILLE, TENN.—Citizens' Auto Co.; capital, $5,000; automobiles. Incorporators: L. D. Harth, F. J. Baumann, J. B. Marcus and others.

MCALESTER, OKLA.—McAlester Car & Auto Works; capital, $25,000; automobiles. Incorporators: H. H. Kirkpatrick, C. Coon, G. Deibler, G. Le Baron, G. C. Jones.

MONTREAL, QUE.—Detroit Electric Motor Co.; capital, $20,000; to deal in electric automobiles.

MUSKOGEE, OKLA.—W. R. Lantz Carriage and Automobile Works; capital, $25,000; automobiles. Incorporators: W. R. Lantz, A. E. Lantz, J. C. Humphries.

NEW ORLEANS, LA.—Acme Automobile Co.; capital, $18,000; to engage in general automobile business; buying and selling new and used cars, and repairing same.

NEW ORLEANS, LA.—Southern Cyclecar Mfg. Co.; capital, $10,000; to deal in cyclecars.

NEW YORK CITY—Indiana Commercial Truck Corp.; capital, $10,000; deal in motor trucks. Incorporators: H. H. Lawson, S. M. Richardson, M. Ely.

PORTLAND, ORE.—Klingelsmith Electric Truck Co.; capital, $500,000; to manufacture and deal in motor trucks. Incorporators: A. F. Jones, A. A. Richards.

REEDSBURG, WIS.—Reedsburg Motor Truck Co.; capital, $100,000; to manufacture commercial vehicles. Incorporators: E. N. McNab, E. E. Montgomery, E. Thom, J. Seamans.

RICHMOND, VA.—Brodrick-Glennan Corp.; capital, $10,000; automobiles. Incorporators: W. S. Brodnick, M. Glennan.

RICHMOND, VA.—Rosslyn Garage; capital, $1,000; automobiles. Incorporators: C. R. Pritchard, R. G. Finney.

RICHMOND VA.—White American Locomotive Sander Co.; capital, $50,000; to buy and sell automobiles, trucks, etc. Incorporators: W. H. White, J. Frantz.

SAPULPA, OKLA.—Oil City Motor & Machine Co.; capital, $2,000; automobiles. Incoporators: C. W. Tolliver, R. V. Rule, C. W. Welsh.

TOLEDO, O.—Erie Sales Co.; capital, $5,000; automobiles. Incorporators: G. E. Beely, M. R. Smith, F. H. Lutz.

WATERTOWN, N. Y.—Barter-Longtin Auto and Cycle Co.; capital, $5,000. Incorporators: R. Barter, M. Barter, W. Longtin.

YORK, PA.—Chambersburg Auto Co.; capital, $40,000; automobiles. Incorporators: D. G. Pfoutz, T. J. Brereton, F. M. Brereton.

GARAGES AND ACCESSORIES

AUSTIN, TEX.—Oil Mill Machine Shop and Garage; capital, $7,500; garage. Incorporators: E. F. Wolters, D. C. Daniel, C. B. Welhausen.

BROOKLYN, N. Y.—H. & M. Harahe Co.; capital, $10,000. Incorporators: C. Higley, R. M. Hart, B. M. Hart.

CHICAGO, ILL.—Chicago Auto Radiator Co.; capital, $1,500; to manufacture and repair radiators. Incorporators: K. H. Emmerman, L. Schaffer, J. Siegal.

CHICAGO, ILL.—Esplanade Garage and Supply Co.; capital, $12,000; garage. Incorporators: E. W. Roemer, A. Ryan, J. J. Bittourna.

CHICAGO, ILL.—Matz Motor Livery; capital, $1,000. Incorporators: H. Matz, W. Zimmerman, J. J. Marensky.

CINCINNATI, O.—Main Auto Machine Co.; capital, $5,000; repairing. Incorporators: G. D. Haynes, J. E. Weber, N. Weber, W. Rieker, G. J. Fredricks, Jr.

CINCINNATI, O.—U. S. Gas Governor Co.; capital, $410,000; to manufacture gas and gasoline apparatus. Incorporators: A. P. Best, E. W. Patchell, A. J. Koehle, W. H. Best, S. K. Proctor.

COLUMBUS, O.—Columbus Oil Co.; capital, $20,000; to manufacture and deal in all kinds of lubricating oils. Incorporators: C. A. Laubach, C. Laubach, W. T. Trimble, J. H. Trimble, H. Steick.

DETROIT, MICH.—Woodward Pump Co.; capital, $3,000; to manufacture tire pump which attaches to engine by removal of spark plug.

ELYRIA, O.—Guarantee Oil Co.; capital, $10,000; to manufacture petroleum products. Incorporators: G. H. Lewis, A. D. Ely, G. H. Thomas, G. H. Marsh, C. T. Lersch.

GLOVERSVILLE, N. Y.—L. W. House & Co.; capital, $25,000; to manufacture special line of automobile robes and blankets made from mackinaw, velour, fur, etc.

INDIANAPOLIS, IND.—Brant Brothers-Chapman Co.; capital, $15,000; to manufacture accessories. Incorporators: J. R. Brant, W. E. Brant, G. W. Chapman.

INDIANAPOLIS, IND.—Moross Amusement Co.; capital, $10,000; to operate exhibits of motors and speed tests. Incorporators: E. A. Moross, W. S. Bennett, M. Moross.

JAMESVILLE, N. Y.—Zenith Wire Co.; capital, $100,000; to manufacture and deal in electric coils and accessories. Incorporators: W. A. Beattie, H. V. Hulison, H. Hotaling.

MILWAUKEE, WIS.—Milwaukee Steel Products Co.; capital, $25,000; to manufacture steel and iron goods, motor car and engine parts, etc. Incorporators: A. R. Marggraff, E. M. Dougherty, N. Kles.

MILWAUKEE, WIS.—Solid Brass Works; capital, $10,000; operate brass foundry. Incorporators: E. J. Nickey, W. J. Morgan, B. F. Saltzstein.

NEW YORK CITY—Atlas Automatic Jack Corp.; capital, $250,000; accessories. Incorporators: C. Presbrey, J. F. Comstedt, E. M. Raynor.

NEW YORK CITY—Auto Truck Garage Co.; capital, $50,000; garage for trucks. Incorporators: A. G. Brach, H. J. Benjamin, H. B. Embler.

NEW YORK CITY—Central Auto Supply Co.; capital, $5,000; accessories. Incorporators: T. C. Gorman, P. Gorman, E. Emerson.

NEW YORK CITY—Dinshah Sales Co.; capital, $200,000; to manufacture and deal in the Dinshah engine tester and other instruments. Incorporators: A. L. Pinscoffs, J. M. Boteler, A. E. Gunn.

NEW YORK CITY—Eikert Carburetor Co.; capital, $5,000. Incorporators: E. Schulkind, J. H. Lambert, J. Ingle, Jr.

NEW YORK CITY—Park View Garage, Inc.; capital, $1,000. Incorporators: A. Enock, A. Morris, D. Grimberg.

NEW YORK CITY—Powers Shock Absorber Co.; capital, $10,000. Incorporators: P. Powers, J. Lange, F. G. Hurst.

NEW ORLEANS, LA.—Electric Hose and Rubber Co.; capital, $500,000; to manufacture and deal in automobile tires and rubber goods of all kinds.

NOWATA, OKLA.—Woods Garland Petroleum Co.; capital, $25,000; gasoline. Incorporators: A. T. Woods, E. G. Woods, A. Buchana.

OKLAHOMA CITY, OKLA.—Jennie Gasoline Extracting Co.; capital, $20,000; gasoline. Incorporators: J. H. Gauthier, G. W. Colliver, J. A. Peterson, J. S. Thompson, H. Billingsley.

SIDNEY, O.—F. X. Lauterbur Co.; capital, $10,000; repair work. Incorporators: F. S. Lauterbur and others.

ST. LOUIS, MO.—Panama Equipment Co.; capital, $6,000; automobile tire cushions. Incorporators: J. F. Schneider, H. Herfurth, G. G. Geise.

TOLEDO, O.—Boyd Tire & Supply Co.; capital, $10,000; tires. Incorporators: A. A. Atwood, D. P. Boyd, A. E. Boyd.

TULSA, OKLA.—Diamond Gasoline Co.; capital, $100,000; gasoline. Incorporators: J. W. Sanders, J. J. McPherson, W. H. McCrum.

TULSA, OKLA.—Mid-Co. Petroleum Co.; capital, $25,000; gasoline, etc. Incorporators: M. M. Travis, A. E. Aaronson, R. S. Fellows.

WAUSAU, WIS.—Wausau Abrasives Co.; capital, $50,000; to manufacture discs and wheels for grinding machines, etc. Incorporators: R. E. Chartier, P. W. Sawyer, J. K. Sawyer.

CHANGES OF NAME AND CAPITAL

AKRON, O.—Star Rubber Co.; increase of capital from $250,000 to $350,000.

CHICAGO, ILL.—Automatic Motor and Engineering Co.; capital increased from $125,000 to $200,000.

CHICAGO, ILL.—Lakeside Motor Truck Trans. Co.; change of name to Chicago Interurban Express Co.

CLEVELAND, O.—Alco Motor Co.; change of name to Malin Motor Co.

HAGERSTOWN, IND.—Light Inspection Car Co.; change of name to Teetor-Hartley Motor Co.

KANSAS CITY, MO.—Packard Motor Co.; capital increased from $2,000 to $40,000.

TRENTON, N. J.—Kelly-Springfield Tire Co.; capital increase $5,149,500 to $10,299,000.

Accessories for the Automobilist

BORG & BECK Dry Plate Clutch—A dry plate clutch of new design, Fig. 1, has recently been brought out by the Borg & Beck Co., Moline, Ind. It is a three plate construction in which the driving member is a single steel disk splined to the clutch shaft. When the clutch is engaged this member is clamped between the face of the flywheel and a thrust ring that is keyed to the flywheel rim but yet is capable of moving longitudinally. Between the metallic surfaces of the flywheel disk and thrust ring there are two asbestos rings which prevent undue heating and wear, and increase the smoothness of the engagement.

The thrust ring is forced into engagement by means of three bell cranks that are actuated by a conical spring seating against the clutch cover. Rollers on the bell cranks act on the inclined surface of the thrust ring and press it towards the flywheel web.

The three bell cranks are carried on a separate ring seating against the clutch cover and is utilized in adjusting the clutch. Although it cannot be seen from the drawing, the back surface of the thrust ring is not a plain cone but is made up of three inclined surfaces such that the ring is not only thicker at its outer than at its inner edge but is also about .25-inch thicker at the thickest than at the thinnest points of its outer surface.

Adjustment of the clutch is accomplished by moving the ring which carries the bell cranks a little to one side so that the rollers bear against the thicker portions of the thrust ring.

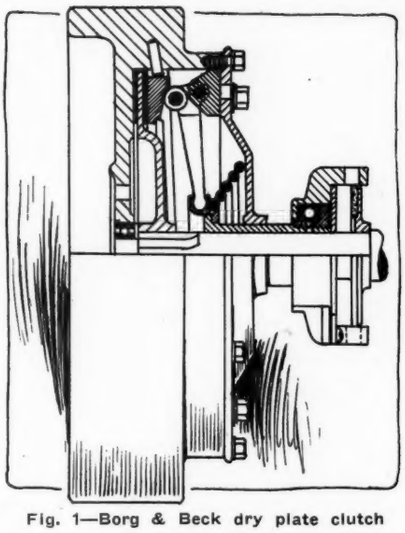

Fig. 1—Borg & Beck dry plate clutch

Martell Aligning Reamer—To reduce the time spent in aligning a new set of main bearings, from 3 or 4 days to as many hours, by the use of its aligning reamer the Martell Motor Co., 1928 Columbus avenue, Boston, Mass., has a device that should interest everyone engaged in manufacturing or repair work.

The reamer, Fig. 3, consists of a shaft which carries a cutting tool with six blades which does the actual reaming after the shaft is brought into exact alignment by the use of eccentric bushings which will be described further on.

In using the reamer on the main bearings, the supporting bushings are passed over the shaft and at the same time the shaft is passed through the bearings to be reamed. At first only two supporting bushings are used, one being fitted to the inner sides of the front and rear bearings. Then by means of the eccentric bushings, inside the supporting bushings, the shaft is lined up until the mesh of the gears is correct and also until the shaft is parallel with the top of the crankcase.

The intermediate bushings are then put in place, one at a time, being so lined up that the reamer shaft can be withdrawn from the rear supporting bushing and returned without the shaft touching the sides of the holes. This is an assurance of perfection in the alignment and yet owing to the sensitiveness of the adjustment it is easy to obtain this result.

The supporting bushings, Fig. 2, that carry the reamer shaft consist of three parts: an inner eccentric bushing that slips over the reamer shaft, an outer eccentric bushing that receives the inner eccentric bushing, and a conical bushing that fits into the bearing and carries the two eccentric bushings. The tapered portion of the conical bushing has 70 threads per inch which allow it to be screwed very firmly into the ends of the bearings or holes to be reamed.

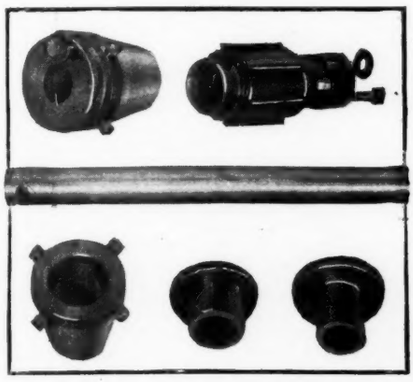

Fig. 2—Martell aligning reamer. Left, top, shows supporting bushing assembled, and the three lower views show it dis-assembled. At the upper right the reamer itself is shown, and in the center is the reamer shaft.

The flanged portion of the outer eccentric is provided with six tapped holes, concentric with the bore and into one of which is screwed a cap adjusting screw, which slides in a circumferential slot in the flange of the inner bushing. The conical bushing is fastened to the eccentrics by means of four cap screws.

The reamer, in the standard instrument, consists of two heads each carrying six blades. Both of these are adjustable and provide for a wide range of work.

Dangle Tank Filler—A telescopic gasoline tank filler that allows the tank to be filled with greater ease and does away with the unsightly spout has been brought out by G. A. Dangle, Detroit, Mich. It is shown clearly in Fig. 4. It will be noted that in this case it is fitted to the cowl, although it can be attached to the rear tank if desired. The special advantage of this design for the dash or cowl is that it is flush with the panel when not in use.

The slidable filling tube cramps itself while in the filling position so that movement in any direction will not occur unless force is applied. The hole is so cut in the tube that it is not necessary to hold a funnel in position when filling the tank. A wire gauze prevents dirt from entering the tank.

Couch Bros. Garage Tents—For housing the car when camping en tour, the Couch Bros. Mfg. Co. is manufacturing a variety of automobile tents complete with poles and stakes. The sizes run from 9.5 by 12 to 12 by 21 feet and the prices from $41.35 to $79.17 for 8-ounce army duck to $60.79 to $119.88 for specially treated government tan duck that is rain and mildew proof.

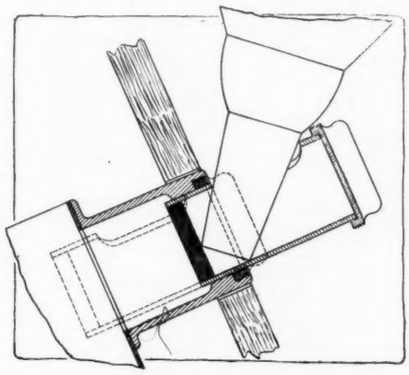

Fig. 4—Dangle cowl tank filler

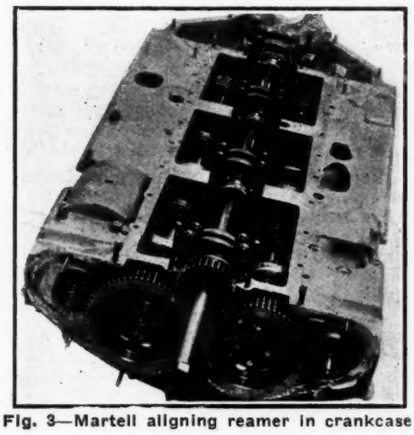

Fig. 3—Martell aligning reamer in crankcase

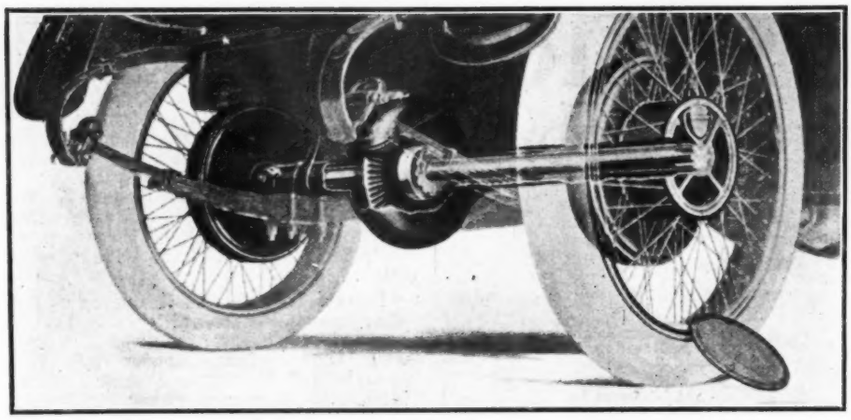

Fig. 5—Luxmore gearless differential that operates by means of a roller clutch in each wheel hub. When rounding a corner the inner wheel drives, the outer one running free

Luxmore Differential—The Luxmore Differential Company, 21 East Van Buren street, Chicago, Ill., will soon place upon the market a differential gear, Fig. 5, the invention of Dr. William Luxmore, of Chicago, which is designed to do away with the divided rear axle and permit the employment of a solid, one-piece rear construction.

By means of a roller clutch in both rear wheels, operating in unison through the agency of a small connecting-rod, which works in a groove in the shaft, a positive two-wheel drive responds to the application of power. As soon, however, as deviation from a straight line of travel becomes necessary, the acceleration in the speed of the outer wheel releases the clutch, the wheel then running free or ratcheting ahead, independently of the axle. Meanwhile, to the inner wheel, still engaging the clutch, is transmitted the whole power. Upon a return to the straight course, the outer clutch, having been held in position by the controlling connector-rod, is again engaged and the wheel resumes its proper load duty.

Whether the car is being driven backward or forward, the clutches, governed by the connecting rod, are acted upon by the wheels according to variations in the line of travel and a perfect differentiation is given.

Malings Resilient Motor Wheel—A spring wheel, Fig. 6, that is intended to take the place of the pneumatic and which embodies several original features in its makeup has been invented by Chas. Malings, Easthampton, Mass.

Resiliency is claimed to be secured by twelve telescopic spokes inside of each one of which is a heavy helical spring. These spokes are pivoted at both ends so that while they take the radial load and the side thrust, the driving strain is carried by eight helical springs that are attached to both the felloe of the wheel and a steel member fastened to the hub.

Pratt & Whitney Adjustable Reamers—Twelve different sizes of adjustable reamers, Fig. 8, are made by the Pratt & Whitney Co., Hartford, Conn. The amount of adjustment depends on the size of the tool, the smallest giving .02-inch and the largest .06-inch.

A feature of these reamers is the eccentric relief which enables them to be set to size without grinding, and also they can be used for facing the bottom of the hole. The advantage of the eccentric relief is that a stiffer cutting tooth is obtained, one that is less liable

Fig. 6—Malings resilient automobile wheel

to chatter. The difference between the two types of teeth is shown in Fig. 7.

In order to set these reamers to size it is only necessary to loosen the shoes and run back the nuts. The blades can then be pushed back and the shoes tightened slightly. Then upon coming up with the adjusting nut the diameter will gradually decrease until the desired size is obtained, whereupon the lock-nut and shoes should be firmly tightened.

P. & L. Valve Adjuster—A simple and easily installed valve adjuster for Ford cars, Fig. 9, is made by the Parkhurst & Lavender Machine Co., Webster City, Ia.

It consists of a small steel shell that slips over the end of the pushrod, a shoulder at one end preventing it from slipping down more than the prescribed distance. The clearance is adjusted by inserting shims of varying thickness in this retainer, the shims being placed between the shoulder and the push-rod. They are guaranteed to give satisfaction and are sold for $1.50 per set of eight.

Savage Tires and Tubes—Two new products have recently been announced by the Savage Tire Co., San Diego, Cal. One is a new non-skid tread, Fig. 10, and the other is a new tube construction.

The latter is especially interesting because the use of soapstone is not required for the reason that a permanent graphite surface is cured onto the tube. The new tube is known as the Red-Graphite. The use of graphite in this way prevents heating, chafing and sticking of the tube and it is further stated that it is exceedingly difficult to pinch the tube.

The Red-Graphite is made of the highest quality of fine Para rubber of extra thickness, it is stated, the wall for a 34 by 4-inch tube measuring ⅛ inch thick. When vulcanizing repairs are made on these tubes or a patch applied the graphite surface is removed by the use of sand paper or emery cloth.

The new non-skid claims attention for the reason that it offers more than 20 inches of gripping surface at all times.

The non-skid feature is obtained by the use of heavy ribs of rubber that are arranged to form a double row of triangles on the top of the tread.

It is stated that the gripping ability of these shoes will last until the entire ribbed surface is worn perfectly smooth, after which there is additional mileage to be obtained from the tire as a smooth tread as an extra amount of rubber lies below the ribs and this is an important feature of the new design, it is claimed.

Motor Aneroid—For the purpose of giving the motorist a simple and ready means of determining the altitude and also the differences in levels of various points F. J. Bernard, 70 Murray street, New York City, has brought out an aneroid which shows the altitude up to 3,000 meters or 9,840 feet. It consists of a glass covered dial with an indicating hand and is designed to be attached to the dash. It sells for $25.

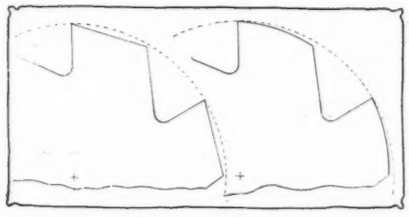

Fig. 7—Left—Ordinary reamer tooth contour. Right—Pratt & Whitney eccentric relief tooth

Fig. 8—Pratt & Whitney adjustable reamer

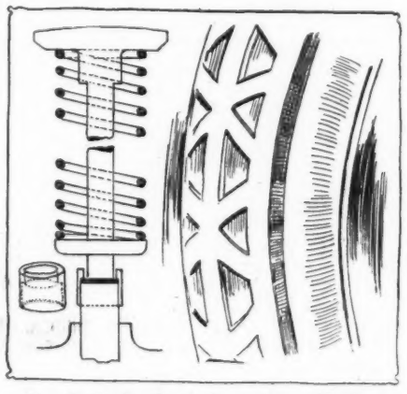

Fig. 9—Left—P. & L. valve adjusters
Fig. 10—Right—Savage non-skid tire